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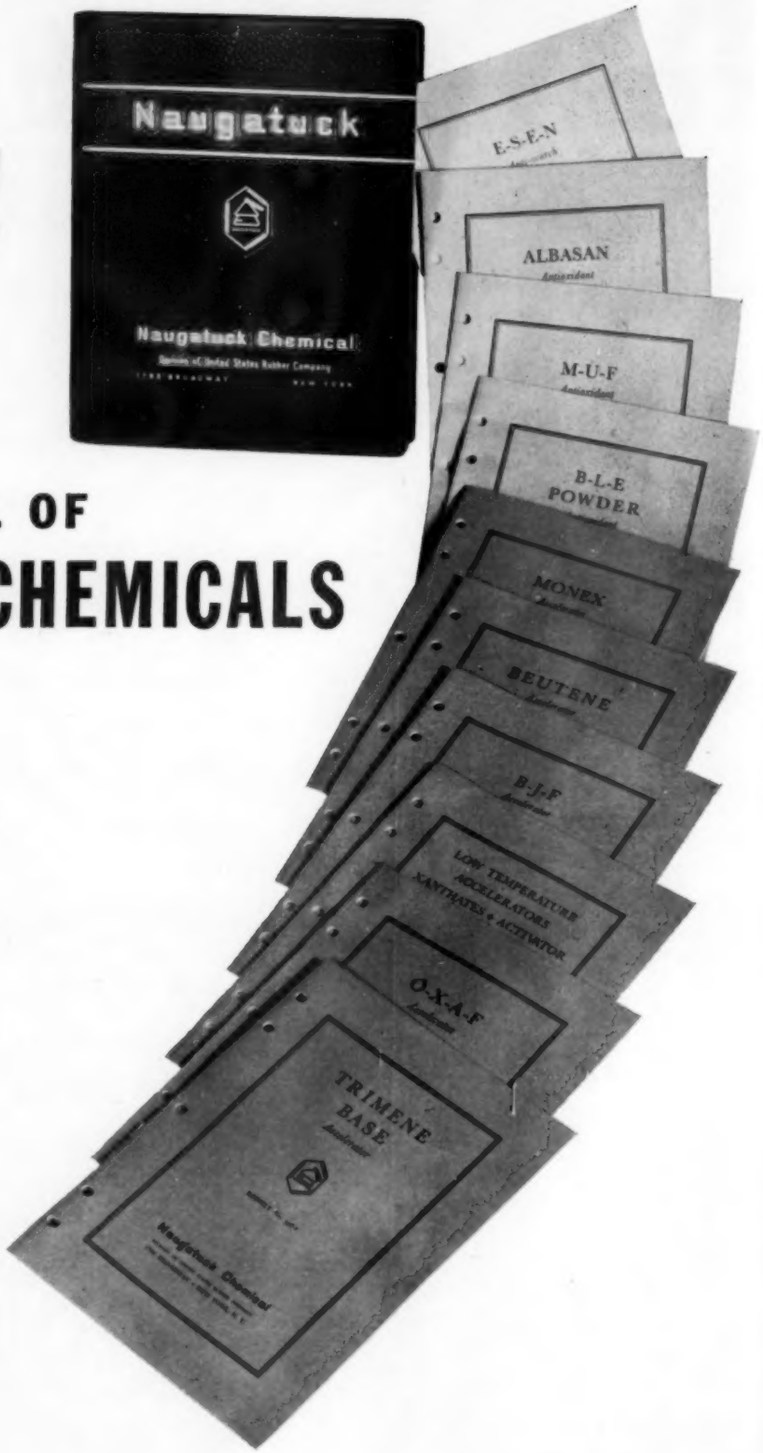

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Building the Spalding "Last-Bilt" Basketball

New Manufacturing Process, Involving the Use of Wax Lasts, Said to Produce Basketballs Possessing Unerring Accuracy

THE BASKETBALLS and volley and soccer balls sold by the Spalding Sales Corporation, New York City, under the trade-name of "Last-Bilt," and manufactured by its A. G. Spalding & Bros. Division at Chicopee, Mass., are distinguished from other brands of similar balls by the fact that they have no stitches, welts, laces or prominent seams. Moreover, they are known as "balanced balls." A description of the manufacture of a "Last-Bilt" Basketball should therefore be of interest.

As the name "Last-Bilt" implies, the basketball is made on a form or "last," thus assuring controlled size and shape. The "last" is made from wax which is poured in a liquid state into one-half of a spherical mold after it has been carefully weighed. The mold halves are clamped together and the completed mold is fastened in a machine which is rotated in two directions while moving through a bath of cold water. The cooling action of the bath, combined with the rotating movements, solidifies the wax in the hollow sphere thus producing a "last."

After the "last" is removed from the mold (Fig. 1) it is covered with several layers of special, light airplane fabric (Fig. 2). Each section of fabric is care-

FIG. 1—Removing wax "last" from mold.

FIG. 2—Operators at the far end are applying layers of light airplane fabric and in foreground leather covers.

FIG. 3—Close-up view of an operator applying selected leather panels on the surface of the vulcanized "carcass."

fully fitted and cemented into place, the cement being of a special composition. Through undisclosed processes, the careful secret of the company, the wax "last" is then removed, and a rubber bladder placed within the ball formed by the light airplane fabric.

Two self-sealing rubber valves are built into the bladder, opposite one another to give perfect balance. Two valves are used instead of one only as a protective feature, since should one turn defective and start to leak it may be plugged, leaving the other usable. The self-sealing valves used permit inflation of air by means of a special needle and are self-closing upon withdrawal of the needle.

At this stage of manufacture, with bladder in place, the ball is called the "carcass." The next step is vulcanization, with curing taking place in a new type of press specially designed to cure balls of this construction. The "carcass" is placed in the mold and after the press is closed it is inflated with air and then vulcanized. In addition to curing the "carcass" into a homogeneous mass, ridges are also molded onto the surface of the ball which outline the shape of the leather panels to be applied. It should also be pointed out that since the bladder is made an actual part of the ball itself it is entirely free from friction and chafe, an important feature of better basketballs.

The next step is the application of leather panels. The panels used are died out of the best parts of first grade sides of leather into the conventional shape used on practically all basketballs. A coating of cement is applied to the underside of the panels and also to the surface of the "carcass," after which the panels are carefully laid into the spaces between the ridges formed in the curing operation and are butted against these ridges (Figs. 2 and 3).

In each ridge there is a groove which provides the same effect in handling the ball and in the flight of the ball as do the seams on a sewed basketball. These ridges or seams are known as "Channel Seams." They are a molded part of the ball and can never wear out. They act much the same as the rifling in a gun barrel making for perfect flight. In addition, they actually make the ball easier to handle and control.

With the leather butted against the ridges or "Channel Seams," the "carcass" is placed into another special molding press which vulcanizes the leather to the "carcass." A finished "Last-Bilt" basketball may be seen in Figure 4 as it looks when emerging from this press. In addition to basketballs this same process is used in the construction of "Last-Bilt" soccer and volley balls, the major difference lying in the size of the wax lasts and the dimensions of the vulcanizing presses.

Spalding claims that balls made by its new process are permanently of the correct size, shape, weight and balance, in addition to infallible accuracy in flight and rebound. The process is also said to allow even wear and to produce balls with three times the life expectancy of those made by conventional methods. Basketballs with "dead" spots and erratic action are a handicap to perfect play. "Last-Bilt" construction, according to Spalding engineers, eliminates any such disadvantages.

FIG. 4—A finished "Last-Bilt" Basketball as it looks when emerging from the press.

MUCH has been written in general terms of the great benefits to be gained from the use of modern machinery in industry. Little definite proof has however been heretofore produced showing the advantages, in dollars and cents, of modernization of machinery and equipment in rubber factories. The following article, based on a first hand study of the operating statements of 21 medium size rubber factories, is the first serious effort that we know of which shows that modernization does pay handsomely.

The result of this survey proves definitely that the greater efficiency and productive capacity of modern rubber machinery and equipment enables rubber manufacturers to increase their profits and frequently bring the plants from the red into the black columns. This article should be of practical value to every operating official in most of the rubber industry's factories.

Modernization Pays Dividends

By Arthur Roberts

- How Does Modernization Pay?
- Can You Afford to Modernize?
- How Much Should You Invest?

—Here Are the Answers!

WHEN a rubber manufacturer is approached to invest in plant modernization, whether a skiving machine, extruder, rubber sheeter, mixing mill or curing press, the first question that arises is, "Will the investment pay me?" Insofar as we know, this query has never been answered definitely, only with general explanations anent the profitable returns resulting from any form of plant modernization touching the manufacture of rubber goods. Generalities, however, too often do not convince; hence, many manufacturers of rubber products, whether erasers, hospital sheeting, pocket combs, rubber flooring, medical sundries or other lines, who would benefit substantially by modernization, do not invest in it.

A definite answer covering the potential profit possibilities in rubber plant modernization is of considerable importance to this industry and inasmuch as this information was obtainable from no source known to us, we analyzed the business records of 21 rubber mills in the East, which had modernized their processing equipment in one way or another from June, 1938, to June, 1939, comparing their profit and loss statements in composite with the 12 months immediately preceding, from June, 1937, to June, 1938, when the same plants were operating with obsolete vulcanizing machines, mills and other machinery of gay ninety vintage.

The composite and condensed comparative statements, compiled specially for RUBBER AGE, visualize with X-ray clarity the profit-building power of modernization. The type of modernization was not considered, the only objective of this research was to show the profitable aftermath of any form of modernization in the processing of rubber goods of any kind, whether a machine for braiding hose or a vulcanizing machine for making conveyor bands or mats.

Statement A is a composite statement of profit on operations covering the 21 plants before modernization when they were still using obsolete or inadequate processing devices. Statement B is a composite statement, constructed in similar manner, showing operating figures for the same 21 plants after modernization with new machinery.

Notice that direct factory costs dropped 3.9 per cent after modernization, of which 2.2 per cent represented an average decrease in cost of materials. Modern machinery is more economical with materials used in the processing of rubber goods. We offer a few case histories taken from our work sheets covering this field study. In one plant, an electric caliper gauge for continuously gauging both edges of sheet material had been installed, which insured greater uniformity of the finished product; consequently, less waste. Previously, this had been a hand operation. In another plant, a modern molding press was installed with positive controls and a head construction that eliminated deflection, insuring correctly pressed pieces without excessive flash. Since installed, material spoilage, high before, had been cut 80 per cent and rejects practically eliminated. Where obsolete and inadequate machinery is being used in rubber factories, it would appear from our findings that losses on waste are abnormally high.

Positive temperature control is often lacking on older processing units, resulting in excessive wastes and high production costs. Adequate controls produce better products at lower costs. Time cycle controls are now essential equipment in leading rubber plants. For temperature and pressure control anywhere in the processing of rubber products, automatic control instruments are being installed so that more uniform goods of higher quality at lower cost are produced. One rubber factory places so much reliance on precision control that a controller and recorder do patrol duty over each platen press and there are more than 200 units. These automatic patrolmen maintain accurate steam pressure during curing.

Recent progress in developing high temperature

STATEMENT A—BEFORE MODERNIZATION

Average Sales, Operating Costs and Net Profit for 21 Rubber Factories—June, 1937 to June, 1938

Sales, less allowances, adjustments, returned goods, and other recorded deductions		$802,641.00 (100.0%)
Direct Factory Costs:		
Materials and production supplies, including losses on waste	$399,715.22 (49.8%)	
Direct labor, including set-up and change time, inspection, and testing	162,936.12 (20.3%)	
Total Direct Factory Costs	$562,651.34 (70.1%)	
Factory Overhead:		
Repairs and maintenance	$ 24,881.87 (3.1%)	
Heat, light, power and water	23,276.59 (2.9%)	
Depreciation and obsolescence on buildings, equipment, molds, dies, automotive equipment, insurance, taxes, interest, indirect labor, and salaries and miscellaneous	86,685.23 (10.8%)	
Total Factory Overhead	$134,843.69 (16.8%)	
Commercial and Administrative Expense:		
Bad debts, advertising, salaries, commissions, traveling expenses, factory warehouse and shipping expense, outside transportation, interest, office supplies, dues, outside auditing, legal service, inventory differences, breakage, samples, freight, express, cartage, parcel post, obsolete finished goods losses, telegraph, telephone, and miscellaneous	$ 95,514.28 (11.9%)	
TOTAL OVER-ALL COST		$793.009.31 (98.8%)
NET PROFIT ON OPERATIONS		$ 9,631.69 (1.2%)

processes for rubber milling and vulcanization has stimulated an interest in highly sensitive and accurate automatic temperature and pressure controls. Precision controls now qualified to meet these new processing demands have been installed in a number of rubber factories, not only those coming under this research but others outside the scope of this field study which are contacted by us from time to time.

Direct labor costs dropped 1.7 per cent on the average after modernization. Since labor cost was 20.3 per cent on sales before modernization and 18.6 per cent afterward, this average reduction of 1.7 per cent represents better than an 8 per cent saving on payroll for direct labor, which is a substantial saving per year in any plant. Modern machinery is much speedier than older units, so, obviously, workers can turn out more production. After installing a modern rubber cutter, one factory cut its costs about in half on this operation. The new machine is much easier to load, faster in operation, is a one-man machine, one operator can load and start it, the cut is completed while he picks up the next load. The many improvements added to modern rubber processing machinery during recent years have been emphasized as labor-cost reducers by rubber machinery manufacturers. This analysis indicates the truth of these contentions.

With the assistance of a new radiator hose machine, the operator in one plant is giving more attention to the making of hose than before because the automatic starting and stopping of the machine, the foot operation of the air valve and switch, leaves the hands of the operator free to handle the hose; hence, operation is more nearly continuous, output increased 22 per cent. Better quality hose is turned out because compressed air pressure on the top roll gives substantial, constant and even pressure, resulting in rightly wound and uniformly wrapped hose. Better controls on this machine produce more uniform quality hose and a stock cut-off attachment to save time and speed up production are other features that are bringing the unit cost of production down.

Where modern stock cutters were installed, superintendents reported greater accuracy and faster cutting of rubber stocks for molded operations, sometimes a decrease of 40 per cent in cutting time as compared to output on older cutters replaced. One factory producing mechanical goods installed a modern cutter with a speed up to 50 cutting strokes per minute, much faster work than the old cutter turned out. The modern unit gives a better cut on cured or uncured rubber stock, just another instance where modernization is turning out a better product for less money.

A number of modern slicers for extruded stocks were installed with high speed disc cutting blades, increasing output and speeding up operations, in some cases, 30 per cent. Another machine that is doing its bit to decrease average direct factory costs, as shown on statement B, is a rubber sheeter with a strip cutting attachment for cutting strips to feed tubing machines, strainers and calenders. Among the costs analyzed on the accompanying statements were the figures of one manufacturer who reduced production costs 18 per cent, better than the average shown, by installing modern tubing machinery for the production of druggists' sundries.

Since laboratory research is becoming of increasing importance in this industry, we find that even the smaller plants are giving more thought to the equipment used in laboratories and investing in new rubber mixing mills for handling small test batches, laboratory vulcanizing presses, calenders, and the like. Investment in new research equipment was included in our calculations although the profitable advantages gained by this type of modernization are not felt as quickly as the profits resulting from replacing "haywire" processing machinery with new. A number of new test-

STATEMENT B—AFTER MODERNIZATION

Average Sales, Operating Costs and Net Profit for 21 Rubber Factories—June, 1938 to June, 1939

Sales, less allowances, adjustments, returned goods, and other recorded deductions		$980,024.66 (100.0%)
Direct Factory Costs:		
Materials and production supplies, including losses on waste	$466,491.73 (47.6%)	
Direct labor, including set-up and change time, inspection, and testing	182,284.59 (18.6%)	
Total Direct Factory Costs	$648,776.32 (66.2%)	
Factory Overhead:		
Repairs and maintenance	$ 16,660.42 (1.7%)	
Heat, light, power and water	18,620.47 (1.9%)	
Depreciation and obsolescence on buildings, equipment, molds, dies, automotive equipment, insurance, taxes, interest, indirect labor, and salaries and miscellaneous	118,582.99 (12.1%)	
Total Factory Overhead	$153,863.88 (15.7%)	
Commercial and Administrative Expense:		
Bad debts, advertising, salaries, commissions, traveling expenses, factory warehouse and shipping expense, outside transportation, interest, office supplies, dues, outside auditing, legal service, inventory differences, breakage, samples, freight, express, cartage, parcel post, obsolete finished goods losses, telegraph, telephone, and miscellaneous	$125,443.15 (12.8%)	
TOTAL OVER-ALL COST		$928,083.35 (94.7%)
NET PROFIT ON OPERATIONS		$ 51,941.31 (5.3%)

ing machines were also purchased by the modernizers. Modern testers give quicker computations over older, slower machines. Testing for the hardness, plasticity and elasticity of rubber is vital in the selection of raw materials and control of processes.

Savings on labor and power were experienced where modern milling machinery and curing presses were installed, resulting in quicker milling, better finish, lower over-all cost. An electric hydraulic vulcanizer effected marked savings in operating and maintenance costs in the molding of sanitary precision rubber products. The installation of an extrusion machine helped bring down the average factory cost shown on statement B by means of a speed-up in production and a saving on mold expense. If space would permit, we could go on giving many other case histories of individual accomplishments attained through the replacement of old machinery with new or the replacement of inadequate, although not obsolete machinery, with units that could handle production more adequately.

Repairs and maintenance dropped 1.4 per cent after modernization. Modern machinery runs smoothly, vibration is less and that means a reduction in repairs and maintenance. In some plants this expense was unusually high before modernization. In one instance, it was 4 times more than the after-modernization figure. In other words, the expense of repairs and maintenance was ¼ what it had been after modern units replaced the oldsters that were always breaking down.

Time out for repairs is costly to rubber manufacturers. We have known of cases where plants have gone in the red during a period when breakdowns were unusually high because machinery was unusually old. Disrupted production, due to breakdowns, means abnormally high production cost and delayed shipments, dissatisfied customers. Despite the fact that sales averaged an increase of 22.1 per cent after modernization, repairs and maintenance expense decreased on the average of $8,221.45 per factory for the 12 months under survey or about 35 per cent.

Surprising as it may seem, the cost of heat, light, power and water dropped $4,656.12 on the average for each plant surveyed or 1 per cent on sales, yet sales increased more than 20 per cent. This indicates that old machinery and old wiring are extravagant with current. Eleven plants had their wiring modernized, installed streamlined lighting too. There is much leakage of current where obsolete, badly insulated wiring is used and it is also dangerous. Modern machinery is more economical in the use of electric energy and steam but if the wiring is inadequate the best results will not be obtained. The fact that modern units are geared to higher speed production has a tendency to direct power costs downward. Then, too, the motors of modern machines are smaller than on older units. Rubber machinery manufacturers, cognizant of the desire to keep down power costs, are constructing modern machinery with this end in view.

Incidentally, motor modernization is needed in many rubber factories. Twelve of those covered on this survey authorized a complete check-over of all motors, replacing inefficient or inadequate units with new. In some plants, where space had been limited before, the deficiency was overcome by installing variable speed motor drives. Where a flexibility of performance is required, such as on a cutter with 15 to 50 cutting strokes per minute, the use of variable speed drives is essential.

Some plants have expanded during recent years but their mill drives have not kept pace, are not engineered to fit the job today although they may have been suitable at one time. Some loads subject drives to stresses and shocks that are successfully withstood only if the drives are adequate for such service. Some mills are using drives with little overload capacity, hence, peak loads may cause breakdowns and increase produc-

"How much you should invest in modernization depends upon the condition and problems of your business. Some factories may require a large outlay for modernization, others only limited sums. None of the companies (in this survey) were in the red after modernization."

tion costs. One reason why production costs decreased on statement B was due to the installation of mill drives ample to handle capacity loads. Some engineers advocate a long overload capacity, say 100%, to provide a wide margin of safety for excessive peak loads.

Materials handling equipment was modernized in 14 factories surveyed, industrial power trucks and conveyors representing 60 per cent of this renovation. In many rubber plants the internal transportation methods are antiquated, modern materials handling equipment would effect movement much faster from preparation of raw materials to the assembling, molding, curing, finishing, storing and shipping of rubber products.

Along with materials handling equipment, better plant layout is essential. The layout in some plants could be improved with profit. Purchasing modern machinery without giving thought to the layout is not good management. Incidentally, modern machinery takes up far less floor space than older units, which reduces overhead, enables a plant to turn out more goods in less space, simplifies layout. With older, more cumbersome machinery, good layout was not always possible because space was at a premium. With the modern, compact units available today, there is no excuse for unscientific plant arrangement.

Since our experience shows that plant layout has an appreciable influence on production costs and net profits, we offer these advantages of better floor layout as reflected by the books of companies we have audited:

(1) Output is increased.
(2) Production is better controlled and regulated.
(3) Those formerly engaged in non-productive work may be released for productive work.
(4) Floor space is increased.
(5) Accident hazard is reduced.
(6) Manufacturing interval has been shortened.
(7) Investment in stock in process has been lessened.
(8) Errors and delays are minimized.
(9) Quality better controlled.
(10) Stock is kept in better physical condition.

When modernizing, consider not only the mills, presses, molders, vulcanizers and other processing units needed for top production at rock-bottom unit cost, but also consider the vintage, adequacy and efficiency of your materials handling equipment, wiring, lighting, floor layout, motors and motor drives. Lighting, by the way, needs streamlining in many rubber plants coming under our observation. Low "seeability", even with modern producing machinery, creates worker fatigue, increases the accident hazard, increases current expense.

A glance at factory overhead before and after modernization shows an average percentage-to-sales decrease of 1.1 per cent although sales averaged an increase of 22.1 per cent, indicating that the factories under survey were not operating to capacity and paying too high an overhead cost per unit produced. High factory overhead is one of the penalties paid for using inefficient processing equipment.

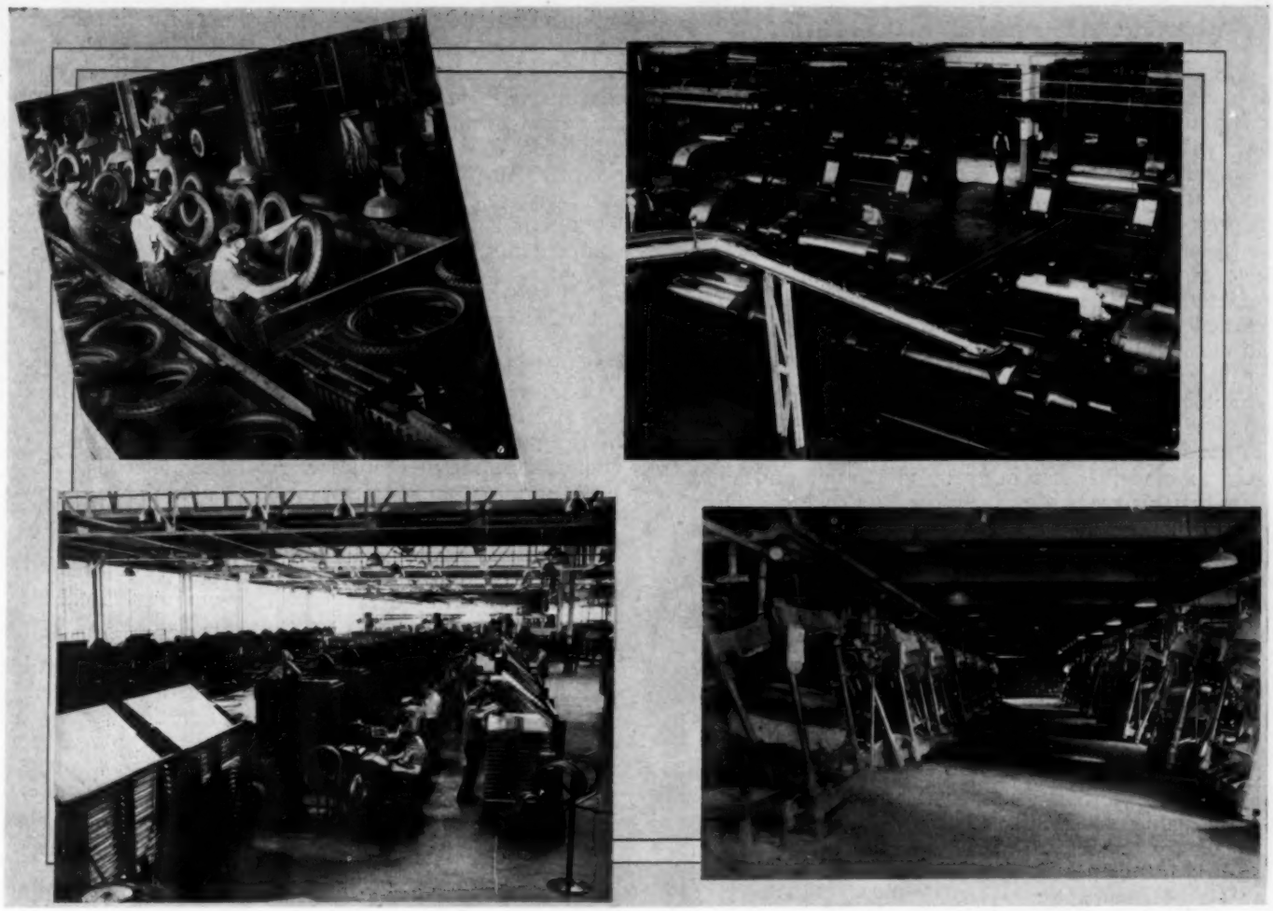
The substantial average sales increase found much of its stimulus in modernization. New machinery improves the finish of goods, giving added snap and brilliance to the colors used, improves aging. With better quality and more eye appealing products to offer, salesmen get more business with less sales resistance and may offer more attractive prices, all of which begets greater selling enthusiasm. Modernization of the rubber plant is a selling as well as a production aid.

Direct factory costs have been combined because the products and methods used by the plants serving as "guinea pigs" for this research were diversified, hence, it was impracticable to give costs by departments and even if so, the set-up would have been very confusing, making it difficult to get a clear picture of the results obtained by the modernizers. Moreover, this information, if it could be broken down and detailed by departments, would be of no greater value than as presented. Factory costs shown covered such operations as preparation of materials, vulcanizing, extruding, hand or machine finishing, assembling, molding, mixing, milling, compounding, spreading, calendering, press work, etc.

Commercial and administrative expense increased but slightly after modernization and this was largely due to greater advertising and selling effort. When a man puts on a new suit, his general disposition chirps up. Likewise, with a plant management. After modernization, the tendency is to increase appropriations for advertising and selling promotions, usually restricted before. Most of the plants surveyed were not spending enough money for such activities before modernization; hence, the commercial expense was below normal and the increase after modernization is to be expected.

Modernization investment, including the necessary alterations, wiring, lighting and installations, averaged $39,642. The average increase in net profits was $42,309.62, which indicates that modernization pays for itself in a year with a little left over, if this research is considered a yardstick. In subsequent years, the profits resulting from modernization are "all velvet". Some rubber factory managements may do better than this, some not so good, but taking it, by and large, modernization pays dividends. Consider this research from any angle and that is apparent. We do not offer this analysis as a sort of formula for any one plant to

"Considering that the rubber factories covered in this research had varying volumes, handled diverse products in different ways and that, as a group, they averaged a substantial increase in sales and net profit after modernization, it indicates that streamlining for business betterment in the rubber industry is a profitable investment."



Examples of modern equipment and well-planned factory lay out are these views from the Goodrich, Ford and Fisk plants.

follow or a picture of what will result if any one plant invests any specified sum in modernization.

The before and after statements give composite figures showing what happened after 21 plants modernized and, since profits increased substantially, it seems reasonable to assume that modernization pays. How much you should invest in modernization depends upon the condition and problems of your business. Some factories may require a large outlay for modernization, others only limited sums. Net profits from operations average only 1.2 per cent before modernization because some of the plants reviewed were in the red and they pulled the average down for the group. None of the companies were in the red after modernization.

Some may contend that the increase in sales may have been due to general business betterment from June, 1938, to June, 1939. We could agree with that assumption and still the benefits of modernization would be very definite because any increase in sales that may have resulted from an upward trend in general business conditions would, in that case, have been handled at an over-all cost of 4.1 per cent under what the costs would have been, had the plants been operating with old machinery and, in certain years, this differential may mean the difference between red and black on a profit and loss statement.

However, we can say from a careful study and analysis of the records providing these figures that improved business conditions are not the basic reasons why the factories showed substantial profit increases on statement B. Modernization was the big apple. Our work keeps us in close touch with manufacturing problems and, consistently, we have found that greater sales and profits result from modernization of plant equipment in good times and bad. The plants covered in this research were no exceptions.

Considering that the rubber factories covered in this research had varying volumes, handled diverse products in different ways and that, as a group, they averaged a substantial increase in sales and net profit after modernization, it indicates that streamlining for business betterment in the rubber industry is a profitable investment. In some plants modernization may effect only 1 or 2 per cent saving on sales but such small differences make a substantial change in net profits.

The averages shown here were compiled with only one objective, *i.e.*, to show the profitable effects of modernization, hence, they cannot be used as yardsticks for general operating averages. To get operating averages for reasonably accurate comparisons, the rubber executive must take figures compiled for those handling similar lines in similar ways and with approximating sales volumes. This research was not conducted to provide average operating figures.

Sometime ago we were talking to a rubber goods manufacturer with a moderately sized plant and he complained, "I can't afford to buy new machinery because business is so bad". He was putting the cart before the old gray mare. More than likely his business was bad because he was operating with obsolete tools. This survey shows that the rubber goods manufacturer cannot afford *not* to invest in modern presses, mixers, vulcanizers and other equipment because his business will never be "tops" if he operates with antiquated processing units.

Santobrite—Latex Preservative

UNTIL recently ammonia was considered to be the most satisfactory preservative for latex from the standpoint of effectiveness at moderate cost. However, when used alone, ammonia produces latex possessing numerous undesirable properties. Because of the volatility of ammonia there may also result losses of preservative and the consequent development of unpleasant odors. It has recently been discovered, however, that small percentages of Santobrite in ammoniated latex produce a product which is not only guarded against biological deterioration but is compatible with manufacturing procedure and compounding materials.

Santobrite, previously called Santophen 20-S, is a product of the Monsanto Chemical Co., St. Louis, Mo. It is the sodium salt of pentachlorphenol and is toxic to algae, bacteria, protozoa, fungi, and other micro-organisms. It effectively combats such organisms which attack rubber as *Aspergillus niger, Penicillium chrysogenum, and Rhizopus nigricans,* and is no more toxic to human beings than many other chemicals in common use. It is soluble in water, an important point since a concentrated aqueous solution permits the addition of the preservative without appreciable dilution of the latex.

Neutral or Alkaline Types Available

Being a stable compound, Santobrite does not tend to react chemically and is not affected by most organic and inorganic substances. It is practically non-volatile at ordinary temperatures. It is supplied either in the form of briquettes or powder and can be obtained as substantially neutral material containing less than 0.5% free alkali, or as a more highly alkaline product containing 3 to 4% free alkali. Since it is neutral or slightly alkaline, the material does not attack appreciably the ordinary metals in the concentrations used for the preservation of latex.

In a series of tests conducted by Dr. Edgar Rhodes, while he was Director of the Chemical Division of the Rubber Research Institute of Malaya at Kuala Lumpur, a satisfactory method for the use of Santobrite as a latex preservative was determined. For the preservation of fresh normal latex 0.10% of ammonia, based on the total weight of the latex, is first added to neutralize acids formed prior to the treatment with Santobrite. There is then added 0.3% of the latter material to the neutralized latex.

Lightly ammoniated creamed latex is preserved by first treating the latex as just described, after which it is creamed by using any of the known creaming agents. After the serum has been discarded, 0.1% of Santobrite, based on the weight of the creamed latex, is added. The final product contains approximately 0.25% of Santobrite and 0.05 to 0.07% of ammonia, as losses in the discarded serum will be approximately 0.15% Santobrite and 0.03 to 0.05% ammonia.

According to experiments conducted on the manufacture of rubber products from Santobrite-preserved latex, increased tensile strength and aging properties are given to the vulcanized film. It has also been determined that there is no loss of Santobrite after the first 30 minutes of extraction. Any latex product, prepared from latex preserved with Santobrite, when cured in water or washed or extracted with water for 30 minutes, contains no extractable Santobrite which can be determined by known chemical methods, according to Monsanto.

Additional tests indicated that Santobrite-preserved latex is more compatible with compounding ingredients than ammonia-preserved latex, said to be a logical conclusion since ammonia tends to form the complex zinc-ammonia ion which produces coagulation. It has also been found that Santobrite is an effective preservative for such compounding ingredients as casein and gelatine, and that its use as a preservative for latex will be complementary to this preservation of compounding materials.

Impervium Insulating Material

A PRODUCT that possesses many of the important characteristics of rubber, including flexibility and elasticity, but which is said to be immune to many of the reagents which deteriorate ordinary rubber, is Impervium, one of the newer synthetic materials. Impervium is not an ordinary coating material which can be brushed or sprayed on metal units to furnish high insulation or resistance to corrosive materials, but is termed "a highly specialized product, to be handled by a well-developed technique and under controlled conditions." The Paramount Rubber Service, Inc., Detroit, Mich., is the sole selling agent for the material.

Tests have indicated that Impervium has unusual dielectric properties. It will char, but it will not burn. The material is not indestructible since, for example, it will not withstand concentrated sulfuric acid at elevated temperatures. Some metal salts are also injurious, but this defect is expected to be overcome as the result of laboratory investigation now being conducted. Sunlight tests showed slight change of color, but no depreciation of the film. Aging is said to appear to have no influence on flexibility and strength of the film. At present, the major use for Impervium is for equipment used in the plating industry.

1939 Rubber Red Book ADDENDA and ERRATA

Page

23 Clinco Products. Purchased by Holland-Rantos Co., which see.

32 Fiber Plastic Corp. Delete. Out of business. Also delete under "Packings" on page 89; under "Rolls" on page 91; under "Miscellaneous" on page 95; and under "Chicago" on page 112.

45 Liquid Rubber Products Co. Delete. Out of business. Also delete under "Latex Products" on page 85; and under "Newark" on page 117.

58 Rex Rubber Co. Delete. Out of business. Also delete under "Tire Accessories and Repair Materials" on page 105; and under "Los Angeles" on page 110.

64 Star Textile Combining Corp. Moved from 247 Richmond St., Brooklyn, N. Y., to Webster, Mass. Disregard deletion notice in previous issue.

203 Air Conditioning Supply Co. Delete. Out of business. Also delete under "Air Conditioning" on page 133; under "Dust Removal Equipment" and "Exhausters, Air" on page 148; under "Heaters, Unit" on page 156; under "Joints" on page 159; under "Nozzles, Spray" on page 176; under "Regulators, Pressure" on page 182; under "Valves" on page 198; and under "Ventilating Equipment" on page 199.

210 Felix Spindel. Correct address is P. O. Box 535, Trenton, N. J. Also change on page 408.

278 A. E. Starkie Co. Correct address is 528 North Culver Ave., Oak Park, Ill.

Carbon Black Adsorption and Its Effects

A Review of the Technical Literature

By Charles J. Glaser, Jr.
Lee Tire & Rubber Co.

CARBON BLACK is one of the most important rubber compounding materials in use today. Although it is used in large quantities and well known to all rubber chemists, some of its characteristics are still veiled by uncertainties and contradictory results. It is the purpose of this paper to review the work of several investigators on the adsorption characteristics of carbon black and to try to draw conclusions from this work which will throw some light on this complex subject.

Types of Adsorption

Adsorption can take place in one of three ways according to Schoenfeld *(1)*:

(a) *Physical Adsorption.* The adsorbed material is held on the surface by physical forces and can be recovered by decreasing the concentration of the adsorbed substance in the surrounding medium or by raising the temperature.

(b) *Activated Adsorption.* A molecular complex is probably formed between the adsorbed material and the adsorbent. This takes place at high temperatures and reaches an equilibrium maximum. The adsorbed material is only partially recoverable.

(c) *Solution.* The adsorbed material diffuses into the interior of the adsorbent. This type requires a high activation energy and a long period of time.

The third type can be eliminated since the time required and the temperatures employed in milling and vulcanizing would not meet the requirements.

Considering the first type, Schoenfeld found that heat treating (raising temperature) carbon black and washing it with a stream of carbon dioxide, nitrogen or steam (decreasing concentration of adsorbed substance) tended to cleanse the surface and increase the adsorptive capacity. An iodine adsorption test substantiated this. However, blacks treated in this manner had a faster rate of cure than before. If adsorption had been of this type, the rate of cure would have been slower than normal since the black could have adsorbed more of the curing ingredients. Therefore, this type is eliminated.

There is much evidence in support of the second type, namely, activated adsorption. The following sections will enlarge upon this point.

Sulfur

Schoenfeld heated carbon and sulfur together and then extracted the mixture to remove free sulfur. Some of the sulfur could not be removed, apparently being held tightly by the black. This black was used in a rubber compound with the sulfur adjusted to give the same total sulfur as was present in a control compound. The sulfur bearing black did not cure as fast as the control showing that the adsorbed sulfur was inert.

Barron *(2)* by using the partition coefficient of a substance in two immiscible liquids devised a method for determining the adsorption of various materials by carbon black. He found that the presence of sulfur did not affect the adsorption capacity of carbon black for other substances and therefore was not adsorbed itself. This result is not a contradiction of the one mentioned above because it is a case of physical rather than activated adsorption (low temperature—no activation energy). It is further proof that physical adsorption is not a contributing factor.

Carson and Sebrell *(3)* found after repeated extraction of a carbon black which had been boiled with zinc oxide and sulfur in xylene that some sulfur still remained in the black. This would be activated adsorption since the temperature was high. The iodine adsorption (physical) remained the same as before boiling which would indicate that the one type of adsorption did not affect the other. They also found that when carbon black was added to a rubber-sulfur mix, the cure was retarded. However, Wiegand and Snyder *(4)* claim that in a test of several kinds of carbon black, none retarded the cure.

Oxygen

The literature abounds in references to the adsorption of oxygen by carbon black and the effects of the adsorbed oxygen on the cure and aging of carbon stocks.

Johnson *(5)* points out that if the oxygen were physically adsorbed it could be removed by placing the black in an atmosphere containing no oxygen. This, however, was not the case. He also found that after exposing carbon black to a high concentration of oxygen, the volatile matter increased and showed no appreciable decrease on exposure to air.

On heating the black to 1000° C., the volatile matter can be driven off. Johnson found it contained, among other things, carbon dioxide, carbon monoxide and oxygen. If heating was carried out under reduced pressure the proportion of oxygen increased and the proportion of the oxides decreased. Schoenfeld treated carbon black with nitrogen at 1000° C. and found that the black had a faster rate of cure than before treating.

The difficulty with which the oxygen is removed (high temperatures and reduced pressures or washing

EDITOR'S NOTE: This paper was one of several submitted in the Technical Paper Contest conducted this year by the New York Group, Rubber Division, A.C.S. It received a high rating.

with inert gas) would indicate that the oxygen is held firmly. Langmuir, in his work with the carbon filament, suggests the formation of a quasichemical complex between the oxygen and carbon. Such a complex would be acidic in nature.

Schoenfeld states that carbon treated *with air* adsorbs more alkali from solution than before treatment. Wiegand and Snyder found that heating carbon in the *absence of air* to a temperature sufficient to remove volatile matter produced a carbon that adsorbed more acid than before treatment. Wiegand *(6)* substantiates this by showing that on heating carbon above 400° C. (the point at which volatile matter is given off) the pH changes toward the alkaline side. He also states that if all the oxygen were removed it would seem that all colloidal carbons would have a high (alkaline) pH. This seems to be ample proof that the complex is acidic.

The fact that the oxygen adsorbed on carbon black is an important factor is shown by the work of Beaver and Keller *(7)*. When different blacks were used in a formula with the accelerator adjusted to give the same curing time for each, the blacks containing high amounts of oxygen required more accelerator. Aging was best on low oxygen blacks. To carry this further, they took two blacks—one containing a large amount of oxygen and one with a low oxygen content—and made a series of mixtures varying in oxygen content from low to high. The mixtures with low oxygen content had the faster rate of cure and those with high oxygen content, the slower rate of cure. They concluded that the presence of oxygen retarded the rate of vulcanization in direct proportion.

Accelerators

Evidence exists which seems to prove that this oxygen complex has a definite effect on the action of accelerators.

Schoenfeld found that oxygen treated blacks retard both acid and alkali acelerated stocks tending to reduce the ultimate physical properties of alkali accelerated stocks and increase the ultimate physical properties of acid accelerated stocks. He concluded that the action is similar to that of an acid retarder. Carbon black cleansed with nitrogen at high temperature (oxygen removed) accelerates both acid and alkali accelerated stocks.

Wiegand and Snyder state that carbon black heated in air showed increased adsorption of diphenylguanidine. Johnson found that blacks with high volatile content (oxygen) adsorbed more Captax and D.P.G. and hence retarded cure.

Litharge Accelerated Stocks

In litharge accelerated stocks it is necessary that the proper amount of fatty acid be present. Wiegand and Snyder found high adsorptive blacks with low pH tend to retard litharge stocks unless sufficient fatty acid is added in excess to overcome the lead soap removed by the black.

It would seem from the foregoing that the ideal carbon would have low volatile content and consequently high pH. This is not entirely the case. Carson and Sebrell heated Micronex to 900-1000° C. (thus removing volatile matter) and found that it was difficult to disperse on milling. Wiegand suggests that a certain amount of oxygen complex is necessary to form the reinforcement bonds between carbon and rubber.

Therefore we are faced with a compromise. The oxygen content or volatile matter must be high enough to facilitate dispersion but not high enough to affect acceleration.

Stearic Acid

Blake *(8)* presents results on the heat of desorption of stearic acid from carbon black which supports the theory that each carbon particle is surrounded by a monomolecular film of stearic acid with the hydrocarbon chain dissolved in the rubber hydrocarbon. Wiegand and Snyder also give data to show that addition of fatty acid improves the quality and rate of cure of low pH carbons.

Barron, using his partition method, found that the presence of stearic acid did not affect the adsorptive capacity of carbon black. As mentioned under sulfur, this is only proof that we are not dealing with purely physical adsorption. It does not disprove the fact that activated adsorption is taking place.

Zinc Oxide

Carson and Sebrell added carbon black to a rubber-sulfur mix and found the cure was retarded. When the black was added to a rubber-sulfur-zinc oxide mix, the cure was accelerated. They boiled carbon black, zinc oxide and sulfur in xylene for four hours and recovered a product which acted as an accelerator in an unaccelerated stock. The product contained 77% sulfur for which allowance was made in the compound.

Wiegand and Snyder suggest that zinc in soluble (soap) form can be adsorbed by carbon black and that enough zinc oxide must be added so that a portion is in excess to activate accelerators.

The idea suggests itself that if there is enough zinc soap present it will satisfy the adsorption requirements of the black leaving the sulfur and accelerator free to act.

Conclusion

In dealing with the adsorption of substances in a rubber compound by carbon black we are dealing with activated adsorption. The amount of oxygen adsorbed on the black is a very important factor in the effect the black will have on the stock. The action of zinc oxide and stearic acid is to iron out or overcome the tendency of the adsorption phenomena to affect the cure.

REFERENCES

(1) Schoenfeld, *Rubber Chem. & Tech.*, Vol. VIII, p. 483 (1935).
(2) Barron, *Rubber Chem. & Tech.*, Vol. VIII, p. 91 (1935).
(3) Carson and Sebrell, *Rubber Chem. & Tech.*, Vol. III, p. 111 (1930).
(4) Wiegand and Snyder, *Rubber Chem. & Tech.*, Vol. IV, p. 407 (1931); *Ibid*, Vol. XII, p. 298 (1939).
(5) Johnson, *Rubber Chem. & Tech.*, Vol. I, p. 485 (1928); *Ibid*, Vol. III, p. 122 (1930).
(6) Wiegand, *Rubber Chem. & Tech.*, Vol. XI, p. 187 (1938).
(7) Beaver and Keller, *Rubber Chem. & Tech.*, Vol. I, p. 458 (1928).
(8) Blake, *Rubber Chem. & Tech.*, Vol. II, p. 633 (1929).

Rubber Is Air Conditioning Aid

DEVELOPMENT of an extruded rubber strip from a special compound is expected to solve the problem of air and moisture infiltration, major worry of the rapidly expanding air conditioning industry, according to announcement just made by the B. F. Goodrich Co., Akron, Ohio. When casement windows are used in connection with air conditioning equipment, infiltration of air and moisture must be kept at an absolute minimum. In tests the performance of the new rubber strip was found to be as much as 200% more efficient than plain and treated felt heretofore used as weather and insulation stripping. One factor in favor of the extruded rubber strip is that a low content of free sulfur in the rubber insures the strip having a minimum tendency to tarnish bronze and brass.

Removing Predetermined Stretch from Cords in Belt Manufacture

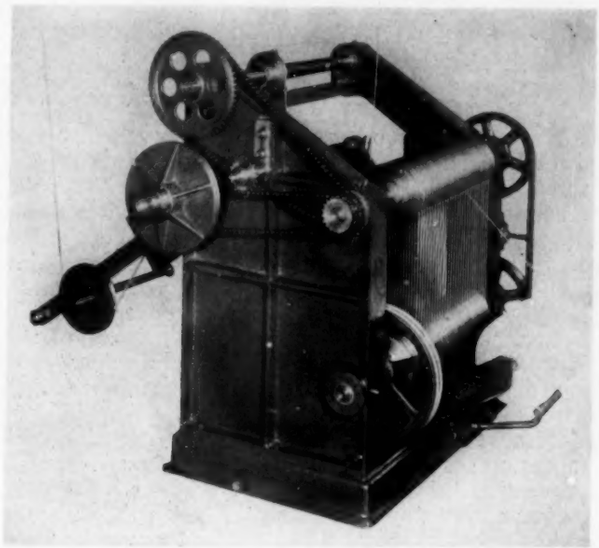
New Normalizing Machine Developed by Howe Machinery Co. Removes Elongation of 6 to 30% from Cords as Required

A NORMALIZING MACHINE which stretches cord prior to its use in the manufacture of rubber and fabric and other types of belting and a drying arrangement which works in conjunction with the normalizer have recently been perfected by the Howe Machinery Co., Passaic, N. J., designers and builders of special machinery for the rubber, textile, paper and other industries. Both pieces of equipment are said to incorporate advantages never before secured by the belting manufacturer.

The cord normalizing machine incorporates a pair of grooved conical rollers for removing any predetermined amount of stretch from the cords. While the standard unit offered by the company removes a maximum of 12% elongation, it may be easily altered for special applications where greater or lesser elongation is desired, as little as 6% or as much as 30%.

The cord is threaded around the grooved rollers, the grooves being successively larger in diameter. The particular groove from which the cord is taken determines the amount of stretch that will be removed. For instance, if the cord is threaded the entire length of the rollers on the standard unit the elongation removal will be 12%, but if the cord is removed from the center of the rollers then only 6% stretch will be removed.

When used in the manufacture of rubber and fabric belts, the cord normalizing machine is placed between the dipping equipment and the drying apparatus. The cord, on spools as received from the cotton mill, is fed to the dipping equipment where it is coated with latex or rubber solution, the stretch being removed over the conical rollers, then continues under tension to the drying apparatus, is dried out while still under tension, and finally is rewound on a spool mounted in front of the normalizer.



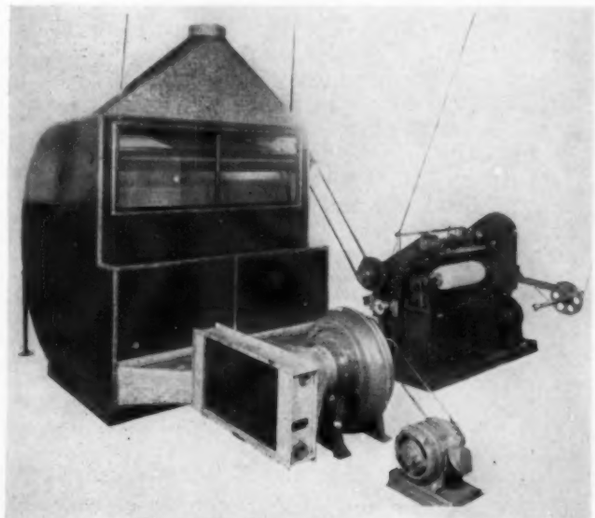
The pair of grooved conical rollers seen in this view of the normalizing machine removes predetermined stretch from cords.

Tension is maintained throughout the entire operation by means of a counter-weighted sheave under which the cord passes directly before it goes to the guide sheave which controls rewinding on the spool in front of the machine. During the stretching operation cord diameter is reduced approximately 22%. The stretching operation also results in improved tensile strength. The machine is capable of handling 200 feet of cord per minute.

The conical rollers on the normalizer are driven by V-belt connection to a 3 h.p. motor mounted in the housing. The rewind spool sheave and the thread guide reel sheave are chain connected to the upper conical roller. The bearing at the opposite end of the rewinding spool sheave from that at which it is driven can be moved down and out of the way when the spool is filled and has to be replaced. Stretch-free cord in rubber and fabric belting results in longer wearing belts.

The drying apparatus developed by the company for use in conjunction with the cord normalizing machine is called the Cyclone Dryer. It is directly connected to the normalizer by roller chain drive and consists of a large drum approximately 5 feet in diameter with "T" iron slats spaced 12 inches apart about the outer peripheral surface and a grooved roller 6 inches in diameter, this roller being driven.

In use, the weighted cord from the normalizer enters the dryer through an aperture at the right top of the



As is seen in this illustration, the drying apparatus is directly connected to the normalizer by roller chain drive.

unit. The cord, traveling downward, is then threaded about the grooved roller and the drum, continuing helically across the width of the machine until it is led to an aperture at one side of the machine. Because of the excessive tension applied on some of the cords, the machine is of very rugged construction. It is well insulated so that very little heat is felt on the outside of the unit.

The blower of the drying apparatus is of the high pressure type, using a 1 h.p. motor. Heat is provided by a booster type steam coil radiator. Heated air is baffled in and out through the cord windings, and finally exhausts through a vent in the top of the machine. A glass door is mounted on hinges in front of the apparatus and electric light bulbs make it possible for the operator to watch the functioning of the cord at all times.

Novel Threading Method Developed

Howe Machinery has developed a novel method of threading the Cyclone Dryer. First, a piece of tempered wire is threaded about the drum and the grooved roller to form a single loop. The cord end is tied to this loop. The machine, when started, pulls the loop of wire around the drum and roller like a belt, and each time the cord end contacts the grooved roller it jumps automatically into the next groove, continuing this action until there is one continuous strand of cord approximately 3,600 feet long helically wound about the roller and mandrel. After the unit is threaded, the wire is removed.

Because processing cords under high tension often causes breaks this threading feature is important. The conventional method of drying cord is to build a rectangular tower, approximately 30 feet high, with idler rollers mounted across the bottom and top of the tower. The cord is then threaded up and down over these rollers and a blower heater attachment gives the necessary changes of air to dry the cord. While this method does a good job of drying, re-threading due to broken cords is often a complicated procedure, one involving a good deal of time, with ladders generally provided for the operator to perform the operation.

Rubber Reduces Evaporation Losses

MILLIONS of dollars are lost annually by the petroleum industry through the evaporation of gasoline at bulk storage plants. The extent of this loss may be realized by a government estimate that during 1938 bulk plants throughout the United States sustained a loss through evaporation of 317,193,060 gallons, valued at $37,963,167.

A vapor-saver system recently developed gives indication of cutting gasoline evaporation losses to a minimum. Simple in operation, the system has as its chief component a sausage-shaped balloon or "breather bag" made of fabric especially treated on the inside with a compound rendering it impervious to the effects of gasoline or gasoline vapor, and rubberized on the outside for external protection. The bags are built by the Goodyear Tire & Rubber Company.

Each "breather bag" is 29 feet long, 9 feet in diameter, and has a capacity of more than 1,600 cubic feet. In operation, the bag is housed in a steel building, and pipe lines run from each tank to the bag. On top of the bag is a carefully balanced weight. When evaporation occurs, the vapors pass through the pipes to the bag, are kept under compression by the weight; when evaporation stops, the weight forces the vapors back into the tanks.

Process for Producing Latex Articles

A NEW method for the production of articles from latex by causing the rubber particles in the latex to be deposited on the walls of a porous mold while the water contained in the latex passes through the pores of the mold is detailed in U. S. Patent No. 2,161,281, recently issued to Mitchell Carter of Trenton, N. J., and assigned to Rubber Products, Inc., of Chicago, Illinois. While it has long been known that perfect latex products could be molded by such a method any such processes have been used commercially only to a limited extent because of various difficulties. The new method is said to overcome all previous difficulties.

According to the patent, the process is started with a wet mold, that is, one that is partially saturated, between 20 and 30%, the percentages referring to the amount of water the mold will hold when completely saturated. The mold surfaces are then coated with a flaked material, such as powdered mica, to prevent the latex from adhering to the surfaces. The solution is formed by preparing a suspension of mica in water, using approximately 1 part mica to 20 parts water, adding a small quantity of glycerine to the mixture, approximately 5 parts of glycerine being deemed sufficient. The mixture may be applied to the mold surfaces with a soft brush so as to secure a uniform layer.

Mold Completely Filled with Latex

After this preparatory work, the latex is poured in through an opening sufficient to completely fill the mold, the mold being preferably provided with a chamber of sufficient size to hold a surplus of latex sufficient to keep the mold filled during the entire operation. The mold is then immediately placed in an air conditioned chamber in which a warm, dry atmosphere is circulated and the evaporation which takes place on the outside surfaces of the mold withdraws the water from the latex within the mold, the rubber particles forming a layer on the inner surfaces of the mold. Precautions should be taken, the patent states, to prevent pressure above atmospheric pressure from being built up in the chamber. A relative humidity of less than 70% should be maintained in the chamber and the velocity of the air past the molds should be in excess of 200 feet per minute.

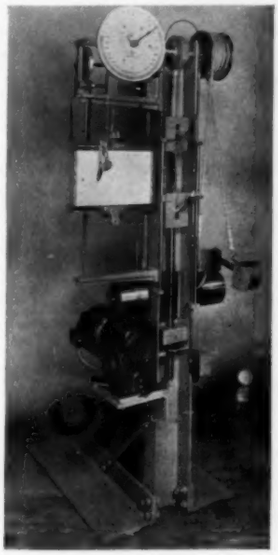
As soon as a layer of rubber of the desired thickness has been accumulated, the mold should be removed from the chamber and the latex remaining in the mold poured out. The mold is then returned to the chamber until the articles are dry enough to handle or when the moisture content of the articles is less than 15%. The drying period should be approximately the same time as the forming period above described. At the end of the drying period the articles are removed from the mold and are then further dried slowly by allowing them to stand until the moisture content is approximately 10%. The articles are then placed in a curing chamber and cured for whatever period may be necessary, depending on the compounding ingredients employed.

After the articles are removed from the mold, the mold is usually in perfect condition as to moisture content for refilling for another molding operation, but the inner surfaces should be coated again with the powdered mica solution referred to previously for much of the mica is removed when the articles are removed from the mold. Therefore, the molds may be continuously used over and over again without either drying or moistening if proper care is taken and the finished articles will be uniform if the procedure is carefully maintained.

New Equipment

Tensile Strength Tester

A GENERAL testing machine for testing tensile strengths up to 2,200 pounds, suitable for use in the textile, cable, belting, industrial fabric and rubber fields, has been introduced by the Saxl Instrument Co.,



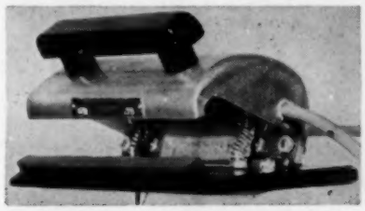
Providence, R. I. It is a vertical machine requiring only one-third of the floor space of the horizontal machines. It has an all-electric control. A new type of recording system is used on the machine which makes it possible to record stress-strain diagrams in a rectangular coordinate system instead of inclined angles. A dead pointer indicates maximum deflection. A feature of the machine is the use of a device which makes it possible to use an exponential dial instead of a linear dial, or, in other words, it is possible to have a larger deflection of the load indicator for the lower range than for the higher range. By this means a greater resolution can be given to the dial at the point where the greatest number of tests is expected.

Midget Static Eliminator

A MIDGET static eliminator, primarily designed for use on electrically-driven office machines, such as mimeographs, multigraphs, etc., but suitable for use on many small industrial machines handling materials of 10-inch width or less, requiring only one static bar, has been developed by the Simco Company, 4929 York Road, Philadelphia, Penna. The eliminator consists of a power unit, 4 x 5 x 3 inches, and one 5/16ths of an inch diameter metal-encased static bar. The high voltage lead is brought out of the power unit and terminates in the female portion of an insulated connector. The bar cable terminates in the male portion. The voltage carried by this unit is said to be the lowest ever used in a static eliminating system and the current output so small that any part of the high voltage system may be touched without receiving a shock.

Bag-End Sealing Machine

SPECIALLY designed for the sealing of Pliofilm bags, a bag-end sealing machine has been introduced by the Sta-Warm Electric Company, Ravenna, Ohio. The machine has a hinged aluminum head (seen in the accompanying illustration) which is brought downward by pressure on the handle to apply



electric heat and pressure on the open end of a Pliofilm bag to seal it tightly shut. The heating coil connects to a source of a.c. or d.c. current by a length of extension cord and plug. A foot-operated attachment can be secured so that both of the operator's hands may be free to hold the bags. One of these sealers is in operation in a plant where shelled nuts, which must be kept fresh, are put up in sealed bags. The management reports, according to Sta-Warm, that the sealing machine provides the needed tight seal and that a production of 50,000 bags per week has been attained with one sealer.

A.T.F. Rubber Plate Machine

ONE of the latest rubber printing plate vulcanizers to appear on the market is that recently introduced by the American Type Founders Sales Corp., Elizabeth, N. J., under the name of the A.T.F. Rubber Plate Machine. Rugged in construction, the vul-

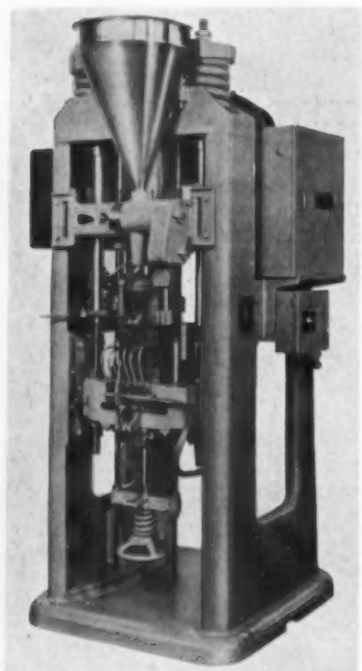
canizer has extra capacity in the heating units, its oversize head ram and cylinder are made of tough alloy steel, it has steel plate side frames, and is built

ADVERTISING PAGES REMOVED

oversize to widen the safety factor. Two models are available, the 14 x 14 model providing pressure up to 50 tons and the 18 x 18 model pressure of 75 tons, the pressures on both models being recorded on readable eye-level dials. Guess work is eliminated in this machine, timing-clock signals advising the operator when the plate is finished. Heat of each platen is controlled separately by thermostats with illuminated dials. It is estimated that a rubber plate, from original to finished state, may be made in 24 minutes with the new machine.

Stokes Automatic Molding Machine

ANOTHER addition to its line of completely automatic molding machines has been announced by the F. J. Stokes Machine Co., Olney P. O., Philadelphia, Penna. This is a 15-ton capacity, 10-inch stroke machine for molding thermo-setting plastics. Rated at 15 tons, it will produce moldings requiring up to 18 tons pressure and mold parts up to 4-inch height, 6-inch length, and 19 square inches of projected area. A feature of the machine is an adjustable bolster to reduce the length of ram travel and thus increase production rates on shallow work. Single-cavity molds are used and the machine, operating continuously, is said



to equal production rates of the large multi-cavity molds used in conventional molding methods. Output from one single-cavity mold is up to 10,000 or more pieces per week and proportionately greater when two or more molds are used in the same machine. Like earlier models this new machine is fully automatic, self-contained, electrically-heated and powered. It stops automatically and sounds a warning signal if a molding fails to eject or the material hopper is empty. It handles all free-flowing thermo-setting materials.

An index to Volume 45 of THE RUBBER AGE will be found facing Page 66 of the October issue. These indexes are published in the April and October issues in each calendar year.

Booklets, Catalogs, etc.

Bibliography of Rubber Patents and Literature—1938. Compiled by J. J. Berliner & Staff, 225 Fifth Ave., New York City. 8½ x 13 in. 43 pp. Mimeographed. $3.50.

This bibliography is divided into two sections, one containing approximately 400 references to the technical literature on rubber which appeared during 1938 (and the latter part of 1937) and the other listing approximately 600 patents issued in that year in various countries, including the United States, England and France. No abstracts are given, the references to the literature listing the title of the article, the name of the author, and the issue in which it appeared, and those to the patents giving the patent by title first, then patentee, assignee if any, and the patent number. Journals given in the literature references are abbreviated with full name (but no addresses) given at the end of the bibliography.

There are three immediate impressions drawn by glancing through this bibliography: *First,* the number of references to the rubber literature are incomplete, only approximately 400 references being given out of a possible total of 1400; *Second,* the references given closely resemble (and in many instances are identical with) those given by other available sources; *Third,* there is neither a subject or an author index. Careless editing is also apparent, dozens of errors cropping up in spelling, punctuation, and general layout. In full honesty, we cannot recommend the purchase of this bibliography to any member of the rubber industry.

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Metaline Oilless Bronze Bearings. (Catalog No. 4). R. W. Rhoades Metaline Co., Inc., 50-17 Fifth St., Long Island City, N. Y. 8½x11 in. 16 pp.

The history of the versatile oilless bronze bearings made by the company, the various types manufactured, and the flexibility they exhibit in meeting unusual requirements are all presented in this complete new catalog which is generously illustrated and attractively compiled. Several new uses of the bearings, as well as Metaline plates and discs, are described. Tables of sizes and specifications are included, and complete instructions for installation are given.

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Hydraulic Molding Presses—1939. Stewart Bolling & Co., Inc., 3190 East 65th St., Cleveland, Ohio. 8½x11 in. 16 pp.

The ring and semi-ring types of presses developed by the company a few years ago are fully illustrated and described in this new catalog, as well as the conventional four bolt and slab side type presses sold by the company. These presses are adaptable for use in the rubber, plastic, composition and synthetic material fields. Each model is clearly pictured, with sizes and specifications given. A review of the development of the ring and semi-ring type presses is also included.

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Special Testing Apparatus in the DuPont Rubber Laboratories. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6¼x9½ in. 16 pp.

Reprinted from the September, 1939, issue of THE RUBBER AGE, this booklet illustrates and describes a number of pieces of special apparatus conceived and designed by DuPont engineers, as well as standard apparatus which was modified to meet special applications. The value of this apparatus for testing purposes is stressed.

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As Broad As All Industry. Cleveland Worm & Gear Co., 3261 East 80th St., Cleveland, Ohio. 8½x11 in. 4 pp.

The application of the company's worms and gears, of which there are 10 separate and distinct types, each in a complete range of sizes and ratios, to specific industries, including rubber, is briefly told in this catalog. Textiles, paper, automotive and chemicals are a few other industries mentioned. There are said to be more than 50 different applications of these worms and gears in the average rubber factory.

Neoprene Types G and GW. (Report No. 39-6). By N. L. Catton and D. F. Fraser. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6¼x9½ in. 20 pp.

The properties of Neoprene Type G were originally described in Report No. 38-9, now out of print. This latest report contains some of the information published in the earlier one together with additional data that has been accumulated in laboratory work and production experience. The "G" Types of Neoprene are distinguished from the "E" Types by relative freedom from odor, faster rate of cure, higher tensile strength, and other characteristics. This report gives the relationship of the various "G" types and then discusses the modifying agents, softeners and other processing materials which should be used with them. One section of the report is devoted to the subject of compounding for specific properties.

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Chemical Engineering Catalog—1939. Reinhold Publishing Corp., 330 West 42nd St., New York City. 8½x11 in. 1026 pp.

Like previous editions, this latest issue of the "Standard Reference Catalog of the Process Industries" is divided into five sections, *viz*: Alphabetical Index, Trade Name Index, Equipment and Supplies, Chemicals and Raw Materials, and a Technical and Scientific Books Section. The inclusion of complete catalogs, an innovation introduced a few years ago, is continued. A new innovation, however, is the publication of several nomographs and charts supplied by various commercial firms and educational and research institutions, including a motor application chart for the process industries, tables on belt conveyor design, and charts on fuel losses in coal and oil fired plants. As usual, the catalog is well printed and should continue to serve a valuable purpose.

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Santobrite—For the Preservation of Rubber Latex. (Tech. Bull. No. 0-17). Organic Chemicals Division, Monsanto Chemical Co., St. Louis, Mo. 8½ x 11 in. 8 pp.

A number of tests conducted in the Far East indicated that Santobrite, previously called Santophen 20-S, the trade name given by Monsanto to the sodium salt of pentachlorphenol, when used as a preservative for latex, resulted in a product which was guarded against biological deterioration and which was still compatible with compounding materials and manufacturing procedure. This bulletin describes some of those tests, gives the properties of the preservative, describes its application, and gives other data of interest to both the producer and manufacturer of rubber. Advantages of using Santobrite as a preservative over other preservatives are stressed.

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De Bepaling van de waterabsorptie van Rubber zoowel in ruwen als in gevulcaniseerden toestand. (The Determination of Water Absorption in Crude and Vulcanized Rubber). By J. W. van Dalfsen. West Java Proefstation, Buitenzorg, West Java, N.E.I. 7¼x10½ in. 13 pp.

The development of a new method for the determination of water absorption of both crude and vulcanized rubber, to be used particularly in the testing of purified rubber, is detailed in this booklet. The actual method, with initial test results, is also given. Although printed in Dutch, the booklet contains a summary in English with captions under tables and illustrations also given English translations.

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De Slijmstof uit den wortel van Pachyra Affinis, als oproommiddel voor Latex. (The Mucilage from the Roots of Pachyra Affinis as a Creaming Agent for Latex). By Th. M. Meyer and J. W. van Dalfsen. West Java Proefstation, Buitenzorg, West Java, N.E.I. 7¼x10½ in. 4 pp. (In Dutch only).

The roots of the *Pachyra affinis* tree contain a mucilage sometimes used as a creaming agent for latex. The authors present a table showing the relation between the concentration and the relative viscosity of various solutions of this mucilage. According to a series of tests, the results of which are given, certain solutions have the capacity to cream latex to about the same extent as average creaming agents of known value.

Directory of Manufacturers in Akron. Akron Chamber of Commerce, Akron, Ohio. 8½x11 in. 52 pp.

This is the first of what is intended to be an annual or biennial directory of all kinds of manufacturers located in Akron, Barberton, Cuyahoga Falls and their suburbs. Complete names and addresses of the manufacturers are listed, together with names of officers and data on products manufactured. In addition, the directory includes a cross-indexed list of products, including rubber manufactures. Because of the large number of such products, only the more important classifications were used. Copies of the directory are offered without charge to purchasing agents requesting it on business stationery.

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A.S.T.M. Standards on Electrical Insulating Materials. American Society for Testing Materials, 260 South Broad St., Philadelphia, Penna. 6 x 9 in. 320 pp. $2.00.

The latest edition of this compilation, of service to all those concerned with electrical insulation and related materials, includes seven specifications and tests of insulating varnishes, lacquers, and similar products. Five standards cover molded materials and five pertain to plates, tubes and rods including a method for testing phenolic molded laminated products and tests for thickness of solid electrical insulation. Four methods cover various rubber products, including insulating and friction tape, rubber gloves, and matting.

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Monsanto Chemicals for the Rubber Industry. Rubber Service Dept., Monsanto Chemical Co., Akron, Ohio. 8½x11 in. 42 pp.

All of Monsanto's accelerators, antioxidants, softeners and colors for the rubber industry are listed in this complete catalog, with specifications and properties and general characteristics and uses of each product given in detail. In addition, brief discussions of various groups of accelerators and antioxidants are included. A history of the Rubber Service Department, and an outline of the services it renders to customers and prospects, is also included.

Book Reviews

Step Out and Sell. By William E. Holler. Published by The Dartnell Corporation, Ravenswood & Leland Avenues, Chicago, Ill. 6 x 9 in. 94 pp. $1.50.

Written by the general sales manager of the Chevrolet Motor Division of General Motors, a man said to be responsible for selling more than four and one-half billion dollars worth of new and used cars and currently in control of a sales organization of more than 97,000 people, this book should appeal to salesmen in every walk of industry. It consists of a series of short tonic "man-to-man" talks on the problems of selling today and tomorrow. These talks include the stories and anecdotes for which the author has earned an enviable reputation. This is not the usual type of book on salesmanship in that it contains no elementary instructions on "how to sell," but rather a book of sound sales common sense. It makes interesting reading.

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How To Buy, Sell and Burn Coal. Written and published by Thomas A. Marsh, 5625 Kenwood Ave., Chicago, Ill. 4¾ x 6½ in. 96 pp. $1.00.

This is a "how to" book. The author, a recognized authority on fuels, furnaces, stokers and combustion, tells how to select coal for manufacturing plants, how to cut fuel bills, stop smoke, increase efficiency, increase steam output, size stoker coal, read fires, and "shoot" trouble on coal and stokers. Reasons and examples are given in each instance, presented in clear, non-technical language. The book also has a section giving a schematic analysis of causes and remedies of scores of fuel burning difficulties, of particular interest to service and operating engineers. Users of industrial coal will find this book of value.

Editorial Comment

New Rubber Contract

THE rubber group of the Commodity Exchange, Inc., will shortly propose a new type of rubber contract to the Board of Governors of the Exchange for official approval. The new contract, if approved, would permit not only delivery of cased rubber, as at present, but of baled rubber as well. Since there is as much baled rubber as cased rubber being imported these days, if not more, the new contract would have definite advantages.

For instance, as explained by Charles Slaughter, president of the Commodity Exchange, a contract permitting the delivery of baled as well as cased rubber would considerably broaden the local rubber futures market and would protect that market against the development of squeeze conditions in the future. The Exchange is not entirely unprotected at present against the possibility of squeeze conditions, since one of the by-laws of the Exchange provide for investigation and action "whenever it shall appear that an interest has been created or a situation exists which endangers the normal functioning of the Exchange."

The purpose of the new contract, however, would practically obviate the necessity for the Board of Governors putting this by-law into operation, since in permitting the delivery of baled rubber there would be far more rubber available than there is under the terms of the present contract.

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England as a Rubber Buyer

STRENGTHENING of prices for spot and futures rubber on the Commodity Exchange these past few weeks is in part attributed to the new position of the British Government in the rubber market. England has to buy a considerable amount of rubber to consummate her barter agreements with the United States and Russia. The deal with the United States calls for the exchange of rubber for cotton, approximately 85,000 tons of rubber being involved, while the deal with Russia calls for the exchange of rubber for timber, the amounts involved being unknown.

In view of this situation it is apparent that the British Government has become a major factor in the rubber market and is likely to remain an important influence for some time to come. While England has not yet actually purchased any rubber for use in its barter arrangements the recent advance of prices in London may be attributed to speculative buying in anticipation of early Government purchases of spot rubber.

There is little fear in England that Germany will obtain possession of any of the rubber going to Russia under the barter deal. Russia needs as much rubber as it can secure for its own purposes, besides which the amount of rubber it will receive under the terms of the agreement will be secured in small amounts and not in large shipments due to the fact that Russia cannot send any large quantities of timber to England at any one time under present conditions.

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Future Statistics

THE International Rubber Regulation Committee, which has developed world rubber statistics to a high degree of usefulness in recent years, has made no statement as yet regarding its future statistical work. However, the fact that the restriction scheme will definitely be continued, even should permissible exports be still further liberalized, as expected, indicates that at least the framework of the current statistical structure will be maintained.

While delays must be expected on the compilation and publication of world statistics during the course of the European war there is no reason why statistics on shipments from exporting countries should not remain available. Of course, the largest difficulty in the maintaining of accurate figures will be encountered in compiling information on consumption and net imports of beligerents, since warring nations, including England herself, will be reluctant to give any data on available supplies.

CURRENT • NEWS of the Rubber Industry

NOVEMBER, 1939

MORE RUBBER USED IN AUTOS SEEN AT SHOW

It was instantly evident from the models on exhibit at the 40th National Automobile Show, held in Grand Central Palace, in New York City, on October 15-22, that the 1940 models are making still greater use of rubber than ever before. Of the 19 American makes shown, approximately 15 of them have adopted latex foam cushioning for seats. All of the General Motors cars, with the exception of Chevrolet, are now equipped with this type of cushioning, as well as Hudson, which pioneered them last year, Chrysler, Nash, Dodge, and DeSoto.

Latex foam cushions are generally used over a foundation of nested coil springs. For instance, seats in the 1940 Oldsmobile are composed of a resilient bank of coiled springs, individually wrapped and covered with a blanket of thick latex foam padding. Each spring is securely tied and the padding is so securely attached that the cushions maintain shapely and comfortable appearance throughout the life of the car.

New Types of Rubber Mountings

More bodies generally have shock-proof rubber mountings for both engine and chassis. Three- and four-point suspension for engines continues to be favored. Several new types of mountings, however, are in evidence. Pontiac, as an example, is using a rubber-cotton unit. It consists of tire carcass shims placed between the body and the frame as in the past and, in addition, between the frame and the hold-down bolt nut. The tire carcass is made up of alternate layers of strong cotton threads and rubber, vulcanized into an inseparable mass which has both toughness and resilience.

In application, a comparatively large hole is provided in the frame for the body bolt, leaving a sizable clearance between the frame and the bolt. When the body bolts are drawn up securely the tire carcass shims are squeezed up into the clearance space and insulate the bolt from the frame. At the same time they fill the bolt clearance space and limit body movement, relative to the frame, to a vertical cushioning effect. This controlled cushioning, Pontiac engineers point out, accomplishes the desired reduction in body noise level while maintaining the excellent stability which prime car handling demands.

Many other new and improved uses of rubber are apparent in the new cars. Dodge has an improved steering mechanism which is actuated by a lever under the steering wheel, the steering gear itself being mounted in rubber. Chevrolet's stabilized front-end unit, which supports the radiator core, fenders and headlights and safeguards them from weaving and twisting, is rubber-mounted on the front cross-member of the chassis. Rubber-mounted torque arms brace the front springs on the Packard.

Rubber shackles on rear semi-elliptical leaf springs are used by Packard, Studebaker, Dodge and others. Many cars, such as Dodge and Chevrolet, have all their doors rubber-sealed to exclude moisture and dirt and to contribute to lesser vibration. Several of the newer trucks, too, make use of rubber for longer life and more comfort in driving. The Dodge trucks are equipped with latex foam cushion seats, while the Chevrolet trucks feature seat cushions padded with latex-impregnated hair. In practically all cases where running boards have been omitted on passenger cars, to give more interior room, protecting rubber pads are placed on the rear fenders to guard against the enamel being chipped by flying stones.

Of special interest at the auto show was the new Crosley for 1940. These small cars, on the style of the Bantam, feature rubber in several applications. The steering arrangement is of the cam and lever type, the wheel being of molded rubber; the rear one-quarter elliptical springs have rubber shackles and spring bearings; the engine is rubber-mounted; and the floor of the car is covered with rubber mats.

Rubber Lost at Sea

According to reports the first loss of crude rubber on boats sunk at sea in the war between the Allies and Germany was recorded in mid-October when the *City of Mandalay* and the *Yorkshire*, the former owned by the Ellerman Bucknell Line of Liverpool and the latter by the Bibby Line of Liverpool, were sunk off the coast of France. Both ships were said to have been loaded with rubber and were homeward bound from Rangoon. No report on how the ships were sunk was made.

TIRES CUT SHARPLY IN SURPRISE MOVE

In the face of rising raw material costs, many of which, including crude rubber, have advanced as much as 25% in the past sixty days, the Goodyear Tire & Rubber Company, in a surprise and totally unexpected move, announced a series of price reductions on November 1. The reductions range from 6.8% on Goodyear's Heavy Duty Tube to 12.5% on the popular-priced G-100 line.

A full-page statement, signed by P. W. Litchfield, president, which appeared in leading newspapers throughout the country, announced the reductions. According to the statement, Goodyear was able to lower its prices despite mounting costs "by an extensive program of plant modernization and by streamlining our system of distribution." Eight bulk plants were established at strategic points throughout the United States to bring about a more simplified system of wholesale distribution, according to the statement.

Prices May Stabilize Market

Goodyear sales executives expressed the belief that the new price levels will tend to stabilize the tire market. Fictitious list prices, from which long discounts have been offered, are a major evil in the industry, they said, but with wholesale prices reduced and dealer discounts readjusted the new pricing arrangement should correct the evil and re-establish consumer lists on a valid basis.

Later in the month, approximately 10 days after Goodyear's announcement, the B. F. Goodrich Company announced that it was meeting the new Goodyear prices. Although no formal announcements have been made by other companies at this writing, it is understood that the entire tire industry is also meeting the reductions, part by a similar reduction in list prices and part by adjusting both list prices and discounts.

The charge has been made, however, that the Goodyear reductions were "more apparent than real" and that they simply put in black and white the prices that actually have been charged in recent months by dealers who have been working on long discounts. In any event, preliminary estimates indicate that the reductions will mean a decrease of more than 6% in the tire industry's profits recovery.

WORN TIRE DANGERS STRESSED IN STUDY

Recent studies of the National Safety Council show that traffic death rates increase in the winter in all sections of the country, ranging from about 40 per cent over summer accident rates in the northern part of the country to about 20 per cent in the southern part. Records of the Council's National Fleet Safety Contest show that for the last three years the winter accident rate (for all types of accidents) has been 50 per cent higher than the summer rate for these fleets operating in all sections of the country.

Experiments of the National Safety Council also show that inadequate traction is the most dangerous winter hazard, and that safe operation of motor vehicles on curves, and in stopping or starting, is dependent to a great extent on the friction between the tires and the road surface.

Tests of the Safety Council show that on slippery wet pavement at normal driving speeds non-skid treads have definite advantages over smooth tires for traction qualities, because tires which have a non-skid tread obtain better contact with the road surface. These tests also indicate that tires with a non-skid tread give somewhat better traction than smooth tires on snow. On ice, however, no tire is really safe, and the Council recommends chains.

To decrease the hazards of winter driving, the National Safety Council recommends that vehicles be put in good condition for winter use by checking brakes, windshield wipers, headlights, exhaust manifolds, electrical systems and tires, pointing out that in these sections of the country where wet pavements are more prevalent in the winter, tires with good non-skid treads are desirable because of the better traction provided, as compared with smooth tires.

Replacements Mean Economy

The replacement of smooth tires in the fall not only gives added protection against accidents, but also results in economy, because during the winter months tires wear out only about one-third to one-half as fast as they do in summer, according to the Rubber Manufacturers Association. The principal cause of the better wear in winter is the fact that tires run much cooler on account of the lower atmospheric temperatures. Another factor is that in winter the roads, being wet most of the time, cause less abrasive wear on tires than they do in the dry seasons of the year.

The Rubber Manufacturers Association states experience has shown that tires put on in the fall give the minimum amount of trouble. Thus it is possible, by replacing in the fall tires that have become smooth or nearly so, to obtain the added safety of new tires in the winter plus greater value and service, because the tires will give more mileage than if they were put on the following spring.

Coming Events

Dec. 2. "Rubber Ball," Akron, Ohio.

Dec. 4-8. Annual Meeting, American Society of Mechanical Engineers, Bellevue-Stratford, Philadelphia, Penna.

Dec. 4-9. 17th Exposition of Chemical Industries, Grand Central Palace, N. Y. C.

Dec. 5. Los Angeles Group, Rubber Division, A.C.S., Mayfair Hotel, Los Angeles.

Dec. 15. Xmas Party, New York Group, Rubber Division, A.C.S., Building Trades Club, New York.

Jan. 15-19. Annual Meeting, Society of Automotive Engineers, Book-Cadillac Hotel, Detroit, Mich.

April 8-12. Spring Meeting, American Chemical Society, Cincinnati, Ohio.

Oct. 7-11. National Safety Congress, Stevens Hotel, Chicago, Ill.

Records show that 90 per cent of punctures and other tire troubles are experienced in the last 10 per cent of tire life. This is another consideration for motorists who enter the fall with tires nearly worn out and who want to avoid, if possible, the necessity of changing tires on a cold winter day or night.

Introduce Korosealed Items

Bloomingdale's, New York department store, took a page advertisement in several New York newspapers early this month to announce the introduction of several new Koroseal fabric products. Illustrated, described and priced in the advertisements were Korosealed silk shower curtains ($4.50), silk make-up capes ($1.00), silk apron ($1.25), silk sports jacket for men ($5.00), cotton web raincoats for women ($7.95) and children ($5.95), and silk golf jacket for women ($5.00). Korosealed printed rayon by the yard was also offered at $1.95 a yard for "Koraweb" and $1.00 a yard for "Koromist." Korosealed fabrics are impervious to oils, greases or alcohols, are sun resistant and are waterproof. Koroseal is the synthetic rubber-like material developed by the B. F. Goodrich Co.

Vanderbilt Handling Ty-Ply

The R. T. Vanderbilt Co., 230 Park Avenue, New York City, manufacturers and distributors of rubber chemicals and compounding ingredients, has announced the completion of arrangements with the Marbon Corporation of Gary, Indiana, under which it will handle the sale of Ty-Ply rubber-to-metal adhesives to the rubber industry in the United States and Canada. Ty-Ply, suitable for use with a great variety of compounds, is available in two types, one for natural rubber and one for the so-called synthetic rubbers.

PROPOSED CONTRACT MAY BROADEN MARKET

The rubber group of the Commodity Exchange, Inc., New York City, is expected to recommend a new rubber contract shortly to the Board of the Exchange which would permit the delivery of baled as well as cased rubber. The object of the proposed new contract, it is reported, is to broaden the rubber futures market and to protect the market against the possible development of squeeze conditions in the future.

Discussions regarding the advisability of such a change in the rubber contract have been going on for some time, according to a recent issue of the *Journal of Commerce*. They were speeded up as a result of the recent sharp premiums of nearby rubber deliveries over the more distant trading months.

When queried on the subject, Charles Slaughter, president of the Exchange, said that he was naturally fully aware of the situation which exists but that "no apprehension is felt of any squeeze or corner because, aside from such qualified rubber as may now be available in New York, uncertificated or in transit to arrive before the end of December, the Exchange by-laws give the Board ample power to take action to relieve a situation which might endanger the normal functioning of the Exchange."

Advantages of Broader Contracts

The proposal of a broader contract basis was explained by Mr. Slaughter as caused by the fact that while under the present contract only No. 1 ribbed smoked sheets in cases is deliverable on contract, a much smaller percentage of total rubber imports is now coming into the country in cases than when the present contract was adopted. American rubber manufacturers, he said, for the most part give no preference to cased overbaled rubber in their purchases.

As soon as the proposal of the new contract has been formally submitted to the full Board of the Exchange, all interested trade groups will be given an opportunity to express their views on the new contract.

Questions which have not been decided as yet include the number of deliverable grades and the problem of the fixing of differentials. The feeling among some of the sponsors of the new contract seems to be in favor of fixed differentials, however, as against the variable differentials in use before establishment of the current single-grade contract.

Sinclair Builds Addition

The Sinclair-Collins Valve Co., 454 Morgan Ave., Akron, Ohio, manufacturers of valves and other equipment for the rubber and allied trades, is building a 100-foot addition to its plant to accommodate increased business. This is the second addition to the plant in the past two years.

TAX DATA FOR 1937 REVEALED BY BUREAU

According to statistics compiled from corporation income and excess-profits tax returns and personal holding company returns by the Bureau of Internal Revenue, and made public by Secretary of the Treasury Morgenthau last month, rubber manufacturers contributed $6,372,000 in Federal income taxes of all kinds in 1937. In all, 643 rubber manufacturers filed tax returns, but of this number only 320 reported operating profits, the balance showing deficits for the year.

The 320 firms reporting net profits for 1937 had a gross income of $1,012,043,000 and a net income of $47,454,000 after deduction of $964,589,000. The $6,372,000 taxes paid were divided as follows: $5,152,000 normal tax; $1,089,000 surtax on undistributed profits; and $131,000 excess profits tax.

The 294 rubber manufacturers reporting no net incomes for 1937 listed gross income at $94,911,000 which, after deduction of $98,623,000, resulted in a combined deficit of $3,712,000. Thirty-six returns were also filed by inactive corporations.

It should be pointed out that the Bureau of Internal Revenue, in preparing this report, classified corporations industrially according to their predominant business. Therefore, owing to the diversified activities of many corporations the industrial groups listed in the survey, such as the rubber manufacturing industry, do not contain solely corporations engaged exclusively in the industries in which they are classified.

WPA SPENT $3,000,000 FOR RUBBER PRODUCTS

Records of the Work Projects Administration disclose that of the $1,700,000,000 spent for purchase and rental of materials and equipment used on WPA projects, more than $3,000,000 was shared by manufacturers and retailers through orders for tires and other rubber goods, according to a report prepared specially for THE RUBBER AGE.

Federal funds to the extent of $1,934,682 were expended in the first four years of the WPA program for tires and other rubber goods while the amount flowing into the rubber industry, and thus into private payrolls, was swelled by an additional $1,068,559 provided by local government sponsors of the WPA projects.

Of the slightly more than $3,000,000 spent for rubber products by far the greatest amount was expended for tires used on the thousands of trucks, tractors and buses employed on the vast Federal Works program but a considerable amount found its way into the treasuries and payrolls of concerns supplying other rubber goods.

Material of this nature included washers, thousands of yards of rubber hose, and rubber gloves, boots and raincoats supplied to project workers on work that entailed standing in water or in the handling of acids, and a small amount of rubber was purchased in connection with such non-construction activities as nursing schools and nursing projects.

The WPA, in announcing that $1,075,811,148 had been spent for purchase of materials, equipment and other supplies, pointed out that WPA operations required the expenditure of an additional $604,973,815 in Federal and sponsors' funds for rental of equipment from private individuals and contracting concerns in the first four years of its program, which began in 1935. Local governments sponsoring WPA projects provided more than two-thirds of the funds for purchases and more than three-fifths of the total spent for equipment rental.

The WPA announcement said the proportion of the cost of material, supplies and equipment borne by local governments had increased since the start of the program as a result of increased sponsors' cooperation.

Included in the sum spent for material purchases by WPA and the sponsors of its projects was $7,179,114 for motor trucks and tractors, and among the units of rented equipment were 55,746 trucks, and 990 automobiles, buses and transportation trucks used to convey project workers to and from project sites.

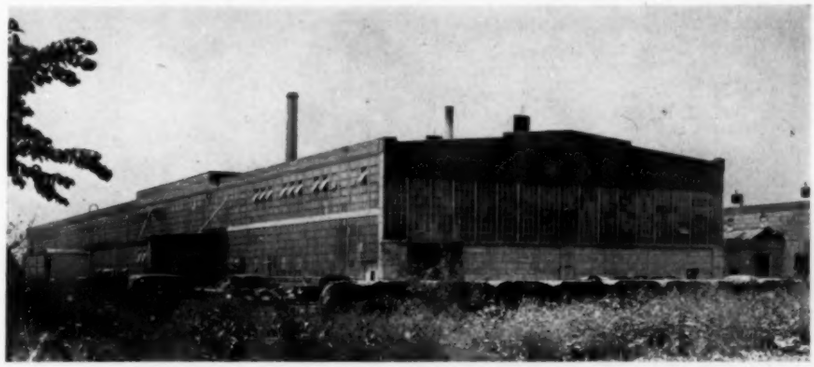
Unite Technical Schools

Armour Institute of Technology and the Lewis Institute, both of Chicago, have entered into an agreement to consolidate into a new technological center. The name of the new school will be the Illinois Institute of Technology, with the background and reputation of the two component colleges recognized by maintaining their names as applied to its two divisions. Actual consolidation of the educational program will not be completed until late in 1940 and for the time being both the Armour and Lewis quarters will be used although the plans call for a new campus, conveniently located, to meet the needs of the broad objectives of the merged units.

Bata Unit Nears Completion

The first unit of the factory being erected at Belcamp, Maryland, by the Bata Shoe Company, a five-story structure, is nearing completion. It is expected that this unit will be put into operation in less than one month. Some shoes and leather goods are already being produced in an experimental fashion and these are being sold from stands to employees. Bata is expected to produce rubbers along with leather footwear and it is believed that the factory unit nearing completion will have a rubbers manufacturing section.

STALWART RUBBER ENTRENCHED IN NEW PLANT



At the time the Stalwart Rubber Company was incorporated in 1920 for the manufacture of molded rubber products at Maple Heights, Ohio, its equipment consisted of one 40-inch mixing mill and 3 single platen hand presses. Later, an extruding department was added and various pieces of equipment purchased to meet the growing demands of the company.

In 1938 it became necessary to materially enlarge both factory and equipment and the company therefore purchased the building which it now occupies in Bedford, Ohio. The building, a front view of which is seen in the above reproduction, was erected in 1916 for the manufacture of war munitions. It is of modern steel and glass construction, 480 feet long by 90 feet wide, with floor space of approximately 43,000 square feet.

As soon as the company was moved into the Bedford plant considerable new equipment was added, including new mills, tubers, vulcanizers, automatic washer cutters and a steam generating plant. The fact that the plant is of one story construction made possible greater production efficiency since straight line continuous production was introduced.

Principal products now made by Stalwart Rubber include miscellaneous molded goods, extruded and lathe-cut products, such as tubing, channels, washers and gaskets, and roll coverings of all descriptions. All of the products manufactured are made to customer specifications. Officers of Stalwart Rubber are H. W. Osborn, president and treasurer, and Ralph H. Tyrrell, vice-president and sales manager. Both work out of the Bedford plant.

FINANCIAL NEWS

Withdraws Stock Offering

The Seiberling Rubber Co., Akron, withdrew its application for registration with the Securities and Exchange Commission of its new prior preference stock last month. Commenting on the withdrawal, J. Penfield Seiberling, president, made the following statement: "The company's affairs have improved so rapidly since the original application for registration was filed last June and such pronounced changes in its financial statements and capital structure have taken place since that time that the directors felt the company's best interests would be served by withdrawing the application for registration and making a new study of the company's financial requirements based on the figures developed in its year-end audit."

Boston Woven Hose & Rubber

Year ended August 31: Net income of $220,350, equal after provision of $45,000 for dividends on 7,500 shares of preferred stock to $2.04 per share on the 86,000 shares of common stock outstanding. This compares with a net loss of $202,151 in the preceding fiscal year. The income was arrived at after deducting $204,365 for depreciation and deduction of $65,285 for taxes. Gross sales amounted to $5,631,257, an increase of 17.4% over the comparable figure in the previous year. Total current assets on August 31, 1939, amounted to $3,856,815 against total current liabilities of $328,836.

Mohawk Rubber Co.

First Nine Months: Net profit of $293,244 after all charges. According to R. E. Bloch, president, net sales for the period increased by $243,451, while selling and administrative expenses dropped from 8.83% to 7.99% over the same period last year. Mr. Bloch also stated that Mohawk was immediately paying $91,000 as balance due on a 1938 reorganization loan of $130,000, although this loan was not payable until April of 1943. This action was taken in view of the fact that working capital on September 30 amounted to $916,442, representing a current ratio of 4.93 to 1. The company still has $220,000 in debentures.

American Cyanamid Co.

First Nine Months: Net income of $3,339,437, after expenses, depreciation, interest, amortization and other charges, equal to $1.25 each on 2,618,369 shares of common stock after allowing for dividend requirements on 208,910 shares of preferred stock. This compares with net income of $1,400,280, or 53 cents a share on the common stock, in the corresponding period of the previous year.

Monsanto Chemical Co.

First Nine Months: Net earnings of $3,613,478, equal to $2.56 a common share after provision for preferred dividend requirements and minority interests, which compares with $1,956,088, or $1.36 a share, in the comparable period of 1938. For the third quarter, the company reports net income of $1,332,901, after all charges, equal to 96 cents a share on 1,241,712 common shares outstanding after deductions for preferred dividend requirements and minority interests. This compares with $731,353, or 51 cents a share, in the third quarter of 1938.

New Jersey Zinc Co.

First Nine Months: Net profit of $3,507,939, after provisions for taxes, depreciation, contingencies, etc., equal to $1.78 each on 1,963,264 shares of common stock, which compares with $2,185,104, or $1.11 a common share, in the first nine months of 1938. For the third quarter, the company reports net profit of $1,460,290, equal to 74 cents each on the common stock outstanding, which compares with $798,246, or 40 cents a share, in the corresponding quarter of the previous year.

Thermoid Company

First Nine Months: Net profit of $244,288, equal to 32 cents a common share, which compares with net loss of $69,595 in the first nine months of 1938. For the third quarter Thermoid reports net profit of $75,555, equal to 9 cents each on 476,388 shares of $1-par common stock after quarterly dividends on 39,956 shares of $3 convertible preferred stock. This compares with $10,037, or 25 cents a share of preferred, in the corresponding quarter of the previous year.

O'Sullivan Rubber Co.

First Nine Months: Net profit of $65,502, which compares with a net loss of $4,313 in the corresponding period of the previous year. Earnings, after taxes and provision for dividends on the $500,000 of preferred stock outstanding, equal 24 cents each on 100,000 shares of unsubordinated common stock. For the third quarter of the year O'Sullivan reports net earnings of $46,939, which compares with $20,423 in the same quarter of 1938.

Anaconda Wire & Cable

Third Quarter: Preliminary report shows net income of $150,423, equal to 36 cents each on 421,981 capital shares outstanding, which compares with $97,057, or 23 cents a share, in the corresponding quarter of 1938.

General Cable Corp.

First Nine Months: Net profit of $44,135, equal to 29 cents a share on the preferred stock, which contrasts with a net loss of $614,327 in the corresponding 1938 period. For the third quarter, the company reports a net profit of $214,415, equal to $1.43 each on 150,000 shares of 7% cumulative preferred stock, which compares with $26,494, or 17 cents a share, in the preceding quarter and a loss of $288,097 in the third quarter of the previous year.

Rome Cable Corp.

Third Quarter: Net profit of $69,090, equal to 36½ cents a share, which compares with $72,075, or 38 cents a share, in the third quarter of 1938. For the six months ended September 30, 1939, the company reports net profit of $115,083, against $61,178 in the corresponding period of the previous year.

Electric Hose & Rubber

Year Ended August 31: Net income of $91,820, equal to $7.20 each on 12,741 capital shares, which contrasts with a net loss of $16,755 in the previous year. The company is reported to be operating its factory at near capacity.

National Rubber Machinery

First Nine Months: Net income of $105,966, after charges but before provision for Federal taxes, which compares with net loss of $57,651 before taxes in the 1938 comparable period.

Star Textile Moves

The Star Textile Combining Corporation, which is headed by Barney Siegal, and which was erroneously recorded as being out of business in the last issue, has actually moved its plant from 247 Richmond Street in Brooklyn, N. Y., to Webster, Massachusetts. The latest type of machinery has been installed in the new plant where the company has 38,000 square feet of floor space. Star Textile Combining Corp. manufactures quarter lining, sock lining, rubberized fabrics, backing cloth and a variety of other materials. P. E. Stevens, who has been associated with the rubber industry for some twenty years, continues as superintendent of the company's manufacturing operations.

Change Name of Hose

The "rubberized" hose merchandised by Richard, Boggs & King, Inc., of Chicago, which is made by processing the finished hose with a special solution developed and provided by the Goodyear Tire & Rubber Company, formerly sold under the name of Durafilm is now known as Bi-o-Film Hose. The change in name was made because some other concern had a prior right to Durafilm. Results with Bi-o-Film stockings to date are said to have exceeded estimates.

LOS ANGELES GROUP HAS MONTHLY MEETING

Seventy-one members and guests attended the regular monthly supper meeting of the Los Angeles Group, Rubber Division, A.C.S., held on November 7 at the Mayfair Hotel in Los Angeles. A talk on recent developments in the rubber industry, a motion picture and the drawing of prizes featured the meeting.

The speaker of the evening was Charles J. Roese of the Goodyear Tire & Rubber Company. Mr. Roese briefly described neoprene, Thiokol and Buna, the three leading so-called synthetic rubbers, and gave a few instances of their practical value over natural rubber. He also discussed Pliofilm and Pliolite, two Goodyear developments, and dwelt upon some of their applications.

Mr. Roese also discussed the substitution of rayon for cotton in the manufacture of certain tires, and then talked about the rapid development of latex foam rubber as applied to the manufacture of automobile seats and mattresses. He gave statistics on the new conveyor belts recently installed at the Coulee Dam and the one now under construction for the Shasta Dam.

Rubber on Farm Stressed

Commenting upon the increasing use of rubber in farm machinery and appliances, the speaker discussed a new self-propelled combine recently built by the Massey-Harris Company, and said the feat was made possible by the development of special rubber tires. He also gave some details of the new snow cruiser built for Admiral Byrd's proposed Antarctic expedition, particularly with regard to the huge tires used on the cruiser and their care when exposed to extremely low temperatures.

Following this talk, a moving picture, "Approved by the Underwriters," was shown by H. G. Ufer, Western Superintendent of the Underwriters' Laboratories, Inc. The film disclosed methods of testing building materials, safes, and glass, all described by accompanying sound explanations. Colored motion pictures of the fishing trip held last summer by the Group were then shown by Ed Royal (H. M. Royal, Inc.).

During the business session a book entitled "Marine Game and Fish" was presented to Garvin Drew, chairman of the Group, which was autographed by all those present. Mr. Drew, associated with A. Schrader's Son, has been transferred to the Brooklyn, N. Y., offices of the company, and is leaving for the East shortly. The presentation speech was made by A. D. McPherson (Goodrich). A number of new members were voted in during the session, bringing total membership up to 260. Leon L. Horchitz (Goodrich), known as the "Walter Winchell of the Group," presented a brief news review.

Of the two door prizes offered, the first, a handsome electric ship's clock, donated by the Binney & Smith Co., through Monty Montgomery of Martin, Hoyt & Milne, local representatives, was won by R. D. Bonham (Goodrich), and the other, book-ends and a dictionary, presented by the National-Standard Co., through L. O. Smith, local representative, went to Richard M. Rockhoff (Firestone). A special prize offered by the Rubbercraft Corporation of California, through the courtesy of R. H. Newell, an electric razor, was won by Dave Good (U. S. Rubber).

Incidentally, both the door prize and the special prize awarded at the October 3rd meeting of the Group, donated by the W. C. Hardesty Company and the American Turpentine & Tar Company, respectively, were contributed through the efforts of B. E. Dougherty, Southern California representative for both concerns. Omission of this credit last month was due to an oversight.

Odd Use of Hose

An unusual application of rubber hose which makes the handling of plate glass easier is reported by a tannery in Buffalo, N. Y. The hose, of Goodrich make, is slit open and snapped over the edges of glass plates to permit handling without breakage. The glass is used in a special leather finishing process in which leather is put face to face with the glass and carried in a vertical position through a drying converter system, resulting in a superior finish on the leather.

Canadian Group Hears Shaw

W. U. Shaw, assistant chief engineer of the National Steel Car Corp., Ltd., Malton, Ontario, was the principal speaker at a meeting held by the Rubber Section of the Canadian Chemical Association, held at McMaster University in Hamilton, Ontario, on October 24. Approximately 60 members and guests attended the meeting and the dinner which preceded it. Mr. Shaw discussed "Aircraft Manufacture, Past and Present" and stressed the growing use of rubber parts in planes. At the business session, C. L. Brittain (Gutta Percha & Rubber), the former secretary, rendered a financial report which was approved. O. B. Crowell (Viceroy Mfg.) was appointed to the Executive Council of the Canadian Chemical Association to represent the Rubber Section.

Chicago Group Meets

The Chicago Group, Rubber Division, A.C.S., was scheduled to hold a meeting at the Hotel Sherman in Chicago on November 10. H. F. Weber, district manager, Positive Drive Division, Link-Belt Company, was the scheduled speaker, his subject being "Modern Positive Drives for Rubber Machinery." A complete report will appear in the next issue.

N. Y. RUBBER GROUP HEARS PRIZE PAPERS

Reading of the three prize winning papers of the Technical Paper Contest sponsored by the New York Group, Rubber Division, A.C.S., earlier this year, and awards to the winners featured the Fall Meeting of that Group, held on October 20th at the Building Trades Club in New York City. Approximately 145 members and guests attended the meeting, which started with a technical session at 4:30 P. M., and finished off with dinner and entertainment later in the evening.

The technical session was opened by Chairman A. H. Nellen (Lee Rubber) who appointed the following members to the Nominating Committee to name officers for 1940 at the next meeting: R. D. Gartrell (U. S. Rubber) chairman, and J. Miscall (Flintkote) and C. A. Bartle (DuPont). He then referred to the Technical Paper Contest sponsored by the Group and read the titles and authors of each of the non-winning papers. Mr. Nellen then thanked the members of the Contest Committee for the work they had done and then turned the balance of the meeting over to S. C. Stillwagon (*India Rubber World*) who acted as chairman of the committee.

Prize-Winners Introduced

Mr. Stillwagon first explained the basis on which the three prize-winning papers were selected from the total submitted and then introduced, in turn, each of the three prize winners, giving a brief biography of each before they presented their papers. Titles of the papers, with author and company connection, together with the amount of the award, follow: *A Critical Analysis of the T-50 Test for State of Vulcanization,* George R. Vila (Naugatuck Chemical), $50.00; *The Measurement of the Plasticity of Rubber,* W. Widenor (Lee Rubber), $40.00; *T-50 Test as a Control for Inner Tubes,* W. B. Dunlap, Jr. (Lee Rubber), $30.00.

When the last paper was presented a resolution was advanced by I. Drogin (Huber) recommending that the Executive Committee consider the possibility of conducting another Technical Paper Contest in 1940 and annually thereafter. It was immediately seconded and unanimously approved. Mr. E. B. Curtis (Vanderbilt), who was recently elected Chairman of the Rubber Division, A.C.S., was then called on to say a few words and spoke for a few minutes in a serious vein, finishing with a clever story.

During dinner entertainment was furnished by a gifted accordionist and later the diners were amused by the performance of Paxton, billed as the "Memory Marvel," who astounded his listeners with an uncanny ability to remember the population, leading theatres and newspapers, and prominent hotels of any of dozens of American cities. The Christmas Party of the Group will be held at the Building Trades Club on Friday, December 15.

Los Angeles News

Garvin Drew, who has been Pacific Coast manager for A. Schrader's Son for some years, was slated to leave for Brooklyn, N. Y., about November 18 where he will take over a position in the main office of his company. He is being succeeded by John Hoerger who has been promoted to the position from that of office manager.

F. A. Steele, general superintendent of the Goodyear plant, attended his first meeting of the Los Angeles Rubber Group in November following his return from England earlier where he had been general superintendent of the company's plant at Wolverhampton. Mr. Steele was among the first of the pioneers in the rubber industry in Los Angeles having come here at the time the Goodyear plant was built.

A. H. Hastorf, of the Binney and Smith Company, New York, spent a few days in Los Angeles this month visiting the local representative, Monty Montgomery. John Snyder of the technical department of the same company was scheduled to arrive about the middle of November.

The wives and children of most of the supervisory force of Goodyear's plant in England have returned to the United States because of war conditions. Mrs. G. G. Balazs and her two children are now in America residing in the middle west. Mr. Balazs, head chemist, former chairman of the Los Angeles Rubber Group, was transferred to the plant in England only last January.

The West American Rubber Company has begun manufacture on a large scale on several new products, according to Charles Lamb, vice-president and general manager. One product is a new rotary hose and coupling assembly for use in oil well operations. The assembly offers greater strength and greater flexibility, according to Mr. Lamb, and since the coupling is a built-in feature with no outside clamps or bolts of any kind it permits an unrestricted flow of fluid. Export shipments have begun on 2½, 3, and 3½-inch hose, inside diameters.

The West American Rubber Company has secured four new patents this year on plugs used for cementing oil wells. One of these is a fibrous and flexible rubber combination for top and bottom plugs, while another is a plastic and rubber combination.

Edward L. Royal, local manager for H. M. Royal, Inc., was slated to start on his fall business trip to the east coast about November 15. He planned to visit the various companies in different cities for which his company acts as local representative.

T. Kirk Hill, president of the Kirkhill Rubber Company, spent most of the month of October and first part of November in the East. He visited New York, Detroit, and other major cities, besides spending several days on a hunting trip in the province of Quebec. He drove home from Detroit in a new car.

New Reclaim Movie

The latest moving picture to be produced by the Mid-West Rubber Reclaiming Company, East St. Louis, Mo., a fantasy entitled "It Might Happen Here," was given its premiere at the Hotel Waldorf-Astoria in New York City on November 10th before a small audience specially invited by President William Welch. The picture was an excellent presentation of what would happen in the United States if we ran out of crude rubber and how well reclaimed rubber could be used in such an emergency as a substitute. Well conceived and photographed, the picture is intended to be shown in schools and libraries to indicate how the reclaimed rubber industry of this country is geared to fill the needs of the rubber industry in a national emergency.

Akron Group Holds Meeting

Approximately 250 members and guests attended the Fall Meeting of the Akron Group, Rubber Division, A. C. S., held on November 3 at the Akron City Club. After the usual excellent dinner the moving picture film "Inside the Flame," which traces the manufacture of carbon black and explains some of its phenomena, was presented by Godfrey L. Cabot, Inc. Mr. Clair A. Dietrich, who sailed with Admiral Byrd to both the North and South poles, then gave an interesting account of his experiences on both expeditions. Music was furnished during the meeting by the Co-Ed Orchestra.

R. M. A. Adds Directors

Five new members were elected to the board of directors of the Rubber Manufacturers Association for three-year terms at the annual meeting of the Association held at the Hotel Waldorf-Astoria in New York City on October 18. The new directors are: E. S. Boyer, president, American Hard Rubber Co.; T. W. Miller, vice-president, Faultless Rubber Co.; H. E. Smith, vice-president, U. S. Rubber Co.; E. F. Thomas, executive vice-president, Goodyear Tire & Rubber Co., and J. L. Collyer, president, B. F. Goodrich Co.

PROGRESS REPORTED ON ARMOUR RESEARCH

Since September 1, 1938, twenty-nine separate new industrial research projects have been started by the Research Foundation of the Armour Institute of Technology, Chicago, which is soon to be merged with the Lewis Institute, also of Chicago, as reported elsewhere in this issue. These researches are conducted on a non-profit basis, with certain natural advantages accruing to the sponsors of each project.

Included among the researches instituted last year were three of direct interest to the rubber industry, *i.e.*, golf machine, tire fabrication and tire molds. The Research Foundation recently made public the progress achieved by some of the research projects, including those on the golf machine and on tire fabrication. These reports follow:

Golf Machine: Under the direction of T. C. Poulter, scientific director of the Foundation, and C. G. Anderson, the design and construction of a machine to make an accurate classification of golf balls continue for the United States Golf Association. It is intended that all tournament balls in particular meet uniform specifications as to flight, distance and behavior in order that the player's skill alone may determine his game. The machine is capable of delivering tested balls at the rate of 30 per second.

Tire Fabrication: Under sponsorship of E. Wittcopp and O. C. Brodhay, a method of fabrication of small diameter solid rubber heavy-duty truck tires has been developed by T. C. Poulter and Ralph H. Manley, the latter assistant scientific director of the Foundation. The sponsors' objective was the development of an easily replaceable tire which need not be vulcanized to a steel core.

Carbon Black Stock Cut

Inventories of carbon black in the United States were reduced by more than 9,000,000 pounds in September, bringing available supplies down to 141,000,000 pounds as of October 1, due to increased demand from both foreign and domestic sources from the rubber and paint industries. In the first nine months of the year sales are reported to have exceeded production by approximately 16,000,000 pounds. Gauged by the amount of inventory stocks business in carbon black has been progressively better this year since May.

Albonite Rubber Insulation

A special hard rubber called Albonite, suitable for insulating the popular type of collapsible auto radio antenna, has been announced by the B. F. Goodrich Co., Akron. The Albonite compound was found to excel various other available plastics in electrical insulation tests in extended tests, according to Goodrich, particularly in connection with auto radio antenna in which insulation is difficult due to variable humidity and temperature changes.

Names in the News

F. B. Davis, Jr., president, U. S. Rubber Co., New York City, was reelected a vice-president of the Automotive Safety Foundation by the board of trustees of the organization at its annual meeting held at the Hotel Roosevelt in New York City on October 16.

L. P. Savarie, formerly textile engineer for the Western Electric Company at the Kearny, N. J., plant, is now acting as textile research engineer for the Filatex Corporation, Trenton, N. J.

J. J. Allen, who was chief chemist of the mechanical rubber goods division of the Firestone Tire & Rubber Company at the Akron, Ohio, plant, is now chief chemist at the Fall River, Mass., plant of the company.

Cyrus S. Ching, director of public relations, U. S. Rubber Co., New York City, addressed the annual meeting of the Associated Industries of Massachusetts, held in Boston, Mass., on October 19. He discussed preparations manufacturers should make to handle business created by the European situation.

Edward M. Waldo, formerly with E. M. & F. Waldo, Inc., dry color manufacturers and importers, has joined the sales staff of the Smith Chemical & Color Co., Brooklyn, N. Y. He will operate from Smith headquarters at 55 John Street.

R. W. Albright, president and general manager, American Anode, Inc., Akron, Ohio, has become a member of the 100,000 Mile Mainliner Club, the group of air travelers who have flown 100,000 miles or more by commercial transport plane. Other members include T. G. Graham, James J. Newman and Myron L. Taylor, all of the B. F. Goodrich Co., Akron.

Howard N. Hawkes, general sales manager, U. S. Tire Dealers Corp., was elected a vice-president of that U. S. Rubber affiliate last month. He will continue to act as general sales manager, a post he has held for several years.

Abbot H. Thompson, associated with the United Shoe Machinery Corp., Boston, Mass., for the past twenty-two years in various capacities, was appointed advertising manager of the company last month to succeed the late Franklin R. Johnson. He has been connected with the shoe industry since 1908.

John Lyon Collyer, formerly managing director of the Dunlop Rubber Co., Ltd., who was elected president of the B. F. Goodrich Company two months ago, arrived in the United States on the *S. S. Washington* on November 1 to take up his new duties.

Col. Charles E. Speaks, president, Fisk Rubber Corp., Chicopee Falls, Mass., was elected a vice-president of the Associated Industries of Massachusetts, at the annual meeting of that organization held in Boston on October 19. J. William Fellows, of the Boston Woven Hose & Rubber Co., Cambridge, Mass., was reelected treasurer.

Dr. Charles M. Stine, vice-president in charge of research for E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, has been elected to receive the Perkin Medal of the Society of Chemical Industry for 1940. The medal, which is awarded annually for valuable work in applied chemistry, will be presented on January 12 at a meeting to be held in the Chemists' Club in New York City.

Paul C. Jones, formerly chairman of the board of Terminal Warehouses, Ltd., was named president of the Dominion Rubber Co., Ltd., a U. S. Rubber affiliate, at a meeting of the directors of that company held on October 19. He succeeds W. A. Eden who was appointed vice-chairman of the board of directors.

Howard C. Ickes, connected with the Firestone Tire & Rubber Co., Akron, for a number of years, has joined the tire valve division of Jenkins Bros., Bridgeport, Conn. He will work out of the Akron office and contact the tire manufacturers.

George L. Abbott, associated with the tanning and belting industry for twenty-five years, has joined the firm of Graton & Knight, Worcester, Mass., as vice-president and general sales manager. The firm manufactures synthetic rubber packings among other products.

J. H. Dillon, physics research division, Firestone Tire & Rubber Co., Akron, gave a paper on "Rheology in the Rubber Industry" at a Symposium on Rheology in Science and Industry sponsored by the Society of Rheology on October 13 and 14 at the National Bureau of Standards in Washington, D. C.

Ernest K. Halbach, president, General Dyestuff Corp., New York City, was honored by associates in the industry and officers of the company at a dinner held at the Hotel Waldorf-Astoria on October 8. The dinner marked the fortieth anniversary of his entering the dyestuff industry.

A. E. Warner, of the C. P. Hall Co., Akron, Ohio, will address a meeting of the Memphis Section of the American Chemical Society on December 14. The meeting will be held in the Park View Hotel in Memphis. He will speak on "Big Things from Little Beginnings in the Rubber Industry."

Wolfe and Dinsmore Advance

W. S. Wolfe

W. S. Wolfe, former manager of the development department, and R. P. Dinsmore, former assistant to the factory manager, have been named factory manager of all factories in the United States and manager of the development and research departments, respectively, of the Goodyear Tire & Rubber Company. Mr. Wolfe is responsible to Vice-President Clifton Slusser, now on temporary sick leave. Both men have been with Goodyear for many years.

Patterson Heads Plant

Ian D. Patterson, associated with the Goodyear Tire & Rubber Company for the past sixteen years, has been appointed superintendent of the new Goodyear factory now being constructed at St. Marys, Ohio. W. L. Davis will have charge of production, Sam DuPree of the development department, and B. D. Scherer will be operating manager. The plant is expected to be in operation before the end of the year.

P. L. Dildine, vice-president in charge of standards of the B. F. Goodrich Co., Akron, was elected president of the Northern Ohio Chapter of the Society for Advancement of Management last month. H. J. Young, assistant controller, Goodyear Tire & Rubber Co., Akron, was elected vice-president of the same organization.

Lewis H. Brown, president, Johns-Manville Corp., New York City, was presented with the Vermilye Medal by the Franklin Institute on November 14. The medal is awarded in recognition of outstanding contributions in the field of industrial management. Mr. Brown is the first recipient.

T. V. Busk, of the Farrel-Birmingham Co., Ansonia, Conn., was elected a director of the Industrial Advertising and Marketing Council of Connecticut and Western Massachusetts last month.

Sidney M. Cadwell, director of development, tire division, U. S. Rubber Co., Detroit, Mich., has been nominated as president-elect for 1941 of the American Chemical Society. Final elections are determined by mail ballot.

CHEMICAL EXPOSITION OPENS DECEMBER 4TH

The 17th Exposition of Chemical Industries will open at the Grand Central Palace in New York City on December 4th and will remain open daily up to and including December 9th. This year's exposition will be the largest since 1930. Three entire floors of the Palace have been reserved and approximately 95% of total exhibit space available has been reserved. Nearly 300 exhibitors, representing more than 40 industries, have engaged space.

Chemicals, chemical raw materials, and fabricated materials for use in many industrial operations, will be featured in terms of their manufacture and use. One exhibit will be devoted to carbon monoxide and its use as a reagent in educational, industrial and commercial laboratories. In the field of drying agents a soluble anhydrite will be shown to be the result of research on the fundamental nature and behavior of hydrates of calcium sulphate. Applications range from refrigeration to the drying of cable splices in the telephone and telegraph industries, also in a new large scale process for the dehydration of serums from the frozen state.

Showing New Construction Materials

Materials of construction cover a wide range of applications, including acid and corrosion-proof linings for tanks, towers, process equipment, floors, sewers, piers and foundations. Acid, water, and oil-proof linings will be demonstrated in their uses for pickling tanks and acid disposal equipment, also for electrolytic refining tanks, and for acid sludge in petroleum refineries. High flow rate filter aids will be exhibited in terms of greater flexibility and economy as applied to clarification problems.

The field of precision instruments will include the latest types of temperature and pressure measuring devices. Included will be a vibration-proof potentiometer controller, a recorder controller pyrometer for throttling fuel heat, and a new line of rectangular-case indicating recorders and controllers with nine-, ten- and twelve-inch charts for temperature and pressure.

Other interesting instruments of precision will include a machine to determine plasticity. This is described as the first machine to use the dynamometer principle and an elaborate leverage and scale system in order to determine accurately, under controlled temperature conditions, the plasticity of all sorts of pliable material from syrupy substances to materials as tough as unvulcanized rubber. Plasticity is automatically recorded in terms of centimeter grams of torque. Measurement by this instrument is said to provide an accurate index to changes in the material caused by different temperatures, addition of ingredients or fillers, breakdown action of catalysts, etc.

A new recording viscosimeter offers a spiral drive thermometer, the first of its kind ever made, which governs a constant speed temperature increase of the suspension to be measured. Operating between room temperature and 150° C., this viscosimeter is said to be the first instrument in which it is possible to obtain combined temperature-viscosity curves of viscous material.

The exposition will be under the direction of Mr. Charles F. Roth, president of the International Exposition Company, who has been similarly responsible for the management of these expositions since the first one was held in 1915. Permanent headquarters are at the Grand Central Palace, New York City.

Pocono Co. Reorganized

The Pocono Company, Trenton, N. J., has completed its reorganization arrangements. Neil E. Bowman, who served for many years as president of the company, Benjamin Haber and James A. McQuillen, all of whom have acted as permanent trustees of the company since the middle of 1938, have resigned. New elections resulted in the following officers: *President,* Victor S. Pollak; *Vice-President,* Joseph Pugh; *Secretary-Treasurer,* Joseph B. Kiefer; *Assistant Secretary,* Howard Miller. Business is reported to have picked up in the past few months.

Move Research Laboratory

The research laboratory of Thompson, Weinman & Co., Inc., manufacturers of calcium carbonate fillers for the rubber and other industries, has been moved from Cambridge, Mass., to 8 Hartwell Place, Waltham, Mass. Dr. A. R. Lukens is in charge of the laboratory.

Inventors to be Honored

The National Modern Pioneers Committee has been formed by the National Association of Manufacturers, 14 West 49th Street, New York City, to sponsor a search for the nation's outstanding inventors and research workers who will be honored in connection with the observance of the 150th anniversary of the American patent system next year. The nominees will be judged on the basis of the contributions of their inventions and discoveries to the creation of new jobs, new industries and new goods and services which have raised the American standard of living. Forms for the entry of nominees for these Modern Pioneer awards are available from the National Association of Manufacturers.

New Mold Manufacturers

The Ryko Manufacturing Company has been organized at 2557 West Lake Street, Chicago, for the manufacture of molds for the rubber industry. E. H. Ryan and John Kozel, both of whom have been associated with mold activities for many years, are connected with the new company which will specialize in the production of molds for mechanical rubber goods.

Holland-Rantos Buys Clinco

Holland-Rantos Company, New York City, has acquired the Clinco Products Company, Chicago. The purchase price was not announced. The Clinco plant will be moved to New York. Both firms are manufacturers of feminine hygiene products, including vaginal diaphragms.

Obituaries

P. E. Welton, Sr.

P. E. Welton, Sr., president of the Universal Engineering Corp., Akron, Ohio, and associated with the former Akron Engineering Company for a number of years, died on October 12 at the age of 62 following a long illness. Mr. Welton was born in Peninsula, Ohio, on February 5, 1877. His life work was devoted to mechanical engineering and he served with the Adamson Machine Company of Akron and with the former McMyler Interstate Corporation of Bedford, Ohio, in his younger days. An energetic engineer he held twelve different patents on various types of rubber machinery at the time of his death, including one covering the Welton Balanced Type Mixing Apron and another an internal mixer. For many years his work consisted of building small rubber factories in various parts of the United States and Mexico. He leaves a widow and five children.

Mervin E. Barr

Mervin E. Barr, division superintendent of the Buitenzorg, Java, factory of the Goodyear Tire & Rubber Company, died on November 1st, according to word received at the Akron offices of the company. A native of Pennsylvania, Mr. Barr had been associated with Goodyear for twelve years and had spent the last two years in Java. Funeral services were held in Buitenzorg and the body is being returned to this country for burial.

John W. Patterson

John W. Patterson, superintendent of the Seamless Rubber Company, New Haven, Conn., with which he had been associated for more than forty years, died at his home in New Haven on October 23 following a long illness. The entire Seamless plant was closed on the morning of Mr. Patterson's funeral as a mark of respect.

RUBBER SECTION, N. S. C., HOLDS SAFETY SESSION

The 28th National Safety Congress was held in Atlantic City, N. J., on October 16-20, with approximately 8,000 in attendance. As usual, each day of the Congress was marked by sessions held by the various sections of the Council, while the evenings were devoted to specially arranged programs, including the annual President's Dinner and the mid-Congress-week banquet. The Safety Exposition, which is held concurrently with the Congress, was housed in the Exhibition Hall of the Municipal Auditorium and attracted thousands of visitors.

Two sessions were held by the Rubber Section of the Council, on Tuesday and Wednesday, October 17 and 18, both of them in the huge Atlantic City Auditorium. Reports of various committees were rendered and many papers read. The entire program followed the previously announced schedule. (For a complete list of papers presented see the September, 1939, issue of THE RUBBER AGE).

Election of officers for the Rubber Section resulted in the following selections: *General Chairman,* R. W. Morse (Firestone); *Vice-Chairman,* Oliver Hopkins (U. S. Rubber); *Secretary,* C. W. Ufford (Ohio Rubber); *News Letter Editor,* Ralph Farnum (U. S. Rubber). The following were appointed as chairmen for the various standing committees: *Engineering,* D. G. Welch (Hewitt Rubber); *Health,* Dr. W. S. Ash (U. S. Rubber); *Membership,* John L. Grider (American Hard Rubber); *Publicity,* R. M. Weimer (Dayton Rubber); *Statistics,* G. E. Teal (U. S. Rubber).

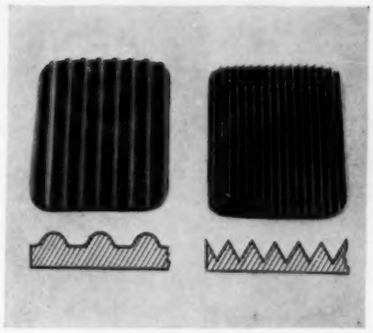
The following were named as members at large: J. J. Loge (General Tire); Paul Van Cleef (Van Cleef Bros.); William Spanton (American Hard Rubber); C. Pritchard (U. S. Rubber); J. E. Lovas (U. S. Rubber); W. H. MacKay (Dunlop Tire); and Urban L. Moler (Inland Div., General Motors). All of those named above, together with the five living past general chairmen, comprise the Executive Committee of the Rubber Section for 1940.

Included among those exhibiting their safety apparatus at the Safety Exposition in the Municipal Auditorium were: E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware; International Shoe Co., St. Louis, Mo.; Lima Cord Sole & Heel Co., Lima, Ohio; Mine Safety Appliances Co., Pittsburgh, Pa.; Panther-Panco Rubber Co., Chelsea, Mass.; W. H. Salisbury & Co., Chicago, Ill.; A. Schrader's Son, Brooklyn, New York; and Willson Products, Inc., Reading, Pa.

Set 1940 Safety Congress

The 1940 National Safety Congress and Exposition sponsored by the National Safety Council, will be held at the Stevens Hotel in Chicago on October 7-11. It will be the 29th Congress.

Ezykleen Matting



Designed particularly for both commercial and household use, a new rubber matting, known as Ezykleen, has been introduced by the B. F. Goodrich Co., Akron, Ohio. Unlike ordinary matting with fine corrugations, Ezykleen does not accumulate dirt and germs readily and is cleaned easily, according to the manufacturer. The ribs of the new matting have a rounded surface which not only makes for faster, easier cleaning, it is pointed out, but it makes the matting less subject to footprinting due to the fact that the soles of the shoes touch only the tops of the ribs. The new matting is offered in six colors. It is made in ⅛-inch thickness in both 24 and 36-inch widths, and in 3/16-inch thickness in the 36-inch width.

Form Rubber Products Co.

Edward J. Malek and Robert W. Whitney, both formerly associated with the Aetna Rubber Company of Cleveland and Ashtabula, Ohio, have organized the Rubber Products Company at Conneaut, Ohio. A two-year lease has been signed on a factory in Conneaut and manufacturing operations are expected to get under way late this month. Mr. Malek is president of the new company, Mr. Whitney is treasurer and Theodore E. Warren is secretary. Rubber Products Company will manufacture hard rubber specialties.

Addition for Ohio Rubber

Ground has been broken for the construction of a 92 x 340 single story addition to the Willoughby, Ohio, plant of the Ohio Rubber Company. The new addition, which will be of brick and steel and which will add 31,000 square feet of floor space to the plant, will be used for shipping and storage purposes. Ohio Rubber now employs approximately 1,300.

Fiber Plastic Bankrupt

On September 26, M. M. Martin, of 1706 South LaSalle Street, Chicago, was appointed receiver in bankruptcy of the Fiber Plastic Corporation, 1800 Roscoe St., Chicago, manufacturers of molded rubber products. In accordance with a court order a public auction was held on October 31 at which Mr. Martin sold all of the company's real and personal property to various purchasers.

PLIOFILM FACTORY SET FOR ST. MARY'S

The first specific factory for the manufacture of Pliofilm, all of which is now being produced by four units in the Akron plants, will be constructed by the Goodyear Tire & Rubber Company at St. Mary's, Ohio, adjacent to the molded rubber goods factory now under construction in that town. P. W. Litchfield, president of Goodyear, has announced that construction of the Pliofilm plant will be started on November 27.

Even though the four units on Pliofilm are in full production at Akron, manufacturing has not been able to keep pace with demand and a 30-day back-order situation exists in several fields. It was to meet this urgent demand for increased production that a new factory was decided upon. The St. Mary's plant will require construction of a new $800,000 building, and when placed in production will give an immediate 50% increase in the company's total production facilities on the material.

Estimated total Pliofilm production for 1939 is 25,000,000 yards and commitments on hand, or anticipated, give promise of a 38,000,000-yard production in 1940, the increase being possible through the additional facilities being made available at St. Mary's. With completion of the St. Mary's plant, Pliofilm will have its own complete production and sales organizations, aligned as follows:

In general charge of sales, A. F. Landefeld; in charge of packaging sales, A. B. Clunan; in charge of merchandising and sales promotion, E. B. Brewster; New York District representative, William O'Keefe; Chicago district representative, H. L. McCleary; Akron district representative, C. C. Ross; Eastern technical service representative, C. E. Gardner; Western technical service representative, George Brown. General Pliofilm production manager is J. P. Maider; production manager of the St. Mary's plant, George Lyon; in charge of operating and shipping, at Akron, B. J. Anthis.

Opens Branch Office

The British Rubber Publicity Association, propaganda division of the International Rubber Regulation Committee for the furtherance of the use of rubber products in England and other countries, has opened a branch office at 1 Albert Mansions, Lansdowne Road, Croydon, Surrey, England, to which address all communications should be sent until further notice.

New Plant for Sebring

Diptex Laboratories, Inc., has been organized in Sebring, Ohio, for the manufacture of toys, gloves and other dipped products from latex, according to newspaper reports. W. D. Lamond, formerly associated with the U. S. Rubber Company, is reported as president of the new concern.

New Rubber Goods

Battery Service Kit

A new one-piece, all-rubber battery service kit and water container, which has four large compartments for battery tools, has been introduced by the Bishman Company, Minneapolis, Minn., manufacturers and distributors of service station equipment and automotive accessories. The center portion of the kit is the water container and holds one gallon of water. Two filler necks hold hydrometer and filler bulb, respectively. Being made of semi-rigid rubber compound, the kit will not scratch or mar the car finish when rested on fenders or other parts. It is a compact unit, measuring only 9 inches in height and 11 inches in length. It provides the service man with every tool needed for servicing or exchanging batteries.

Tidy Shirt Belt

One of the newest of men's apparel accessories is the Tidy Shirt and Health Belt, a product of the Cooper-Brenner Company, Youngstown, Ohio. This belt is made entirely of latex and has no hard buttons. Its purpose is to keep the shirt neatly tucked in and the trousers in proper place. It is worn over the shirt just below the top of the trousers, adjusted just enough to be comfortable. On the inside of the belt are very small studs which prevent the belt from slipping on the shirt, while on the outside are slightly larger studs which have the same action on the trousers. In other words, the latex belt acts as a bond between shirt and trousers, keeping one from bulging and the other from sagging. The Tidy Latex Belt sells for $1.00.

Solid Wheelbarrow Tire

Wheelbarrows, first put on rubber with the development of a special type of pneumatic tire approximately five years ago, may now be equipped with a solid tire with great load-carrying capacity for operations where tires are exposed to excessive abuse. A new 16x3 Vulc-On Tire, cured directly to the wheelbarrow wheel, has been perfected by the B. F. Goodrich Co., Akron, Ohio. Goodrich has also introduced the Nu-Seal Wheelbarrow Wheel, for pneumatics, with bearings sealed against dust and dirt. The new wheel, designed for heavy duty service in brick plants, pottery firms and other ceramic industries, has special bearing seals which eliminate devastating wear on bearings and axles.

Laminated Rubber V-Belt

T. Whittle & Sons, Ltd., Warrington, England, have introduced a laminated rubber V-belt. Due to special construction of the belt, the laminations are free to slide when the belt is bent around a pulley, and the tension on the outside of the belt and the compression on the inside neutralize one another, thus overcoming internal stress. The belt can be bent double without harm or excessive strain. Narrow slots in the fabric links, in which the flat fastening members fit, are only equal to half the diameter of the holes required for equivalent bolts, so that the weakening of the link is reduced by 50%. Belts can be easily joined together or shortened in a few seconds by the addition or removal of links.

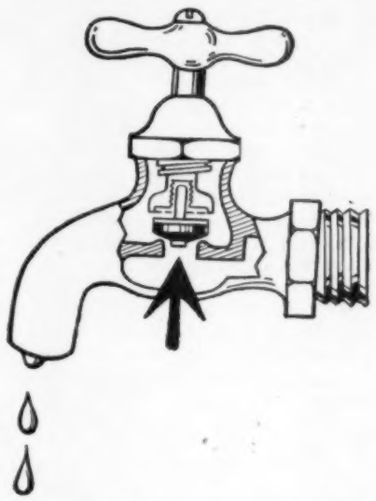
Sponge Rubber Goggle Pad

A comfort cushion pad has been developed by the Chicago Eye Shield Co., 2300 Warren Boulevard, Chicago,

to alleviate the discomfort of wearing goggles on industrial operations such as pre-heating, metal pouring, heavy gas welding, and relining open hearths, and where intense heat is conducted to the wearer's face through the eye cups of molded plastic goggles. This pad, molded from sponge rubber, fits over the eye cups of chipping and welding type goggles. The rubber pad insulates the plastic goggle, preventing blister and burns. When snapped over the eye cup, the elasticity of the rubber holds the pad securely in place without cementing or sewing. Pads can be sterilized and are readily replaced when necessary.

Compression Faucet Washers

Compression on rubber and friction on metal combine to give extra long service to the Ace Compression Faucet Washer recently announced by the Springfield Products Co., Bookwalter Building, Springfield, Ohio. It is made of solid rolled brass and hot water-proof cushion rubber. The rubber cushion makes turning the faucet on and off an easy operation. The valve is so constructed that it steadies the flow of water so that no splashing occurs.



Marshall Tagging Device

A fool-proof marker for open disconnect switches, under the name of the Marshall Tagging Device, has been developed by the Gates Rubber Co., Denver, Colorado. Made of rubber, flaming red in color to attract attention, the new safety appliance for electrical equipment is shaped in the form of a large hook, with a 7¼-inch overall length. It weighs only 4 ounces. A slotted opening in the body fits all standard switch hooks. In use, the device is placed over the end of a switch hook and hung through the eye of an open switch blade, warning everybody concerned not to close the switch. Its construction is such that the switch cannot be closed without the operator's attention being forcibly called to the warning.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, NOVEMBER 9, 1939

Crude Rubber

AFTER climbing from a price of 19.85 for spot on the Exchange on October 11 to 21.00 on October 18, high and low for the period, respectively, the rise being influenced by stronger foreign cables, greater strength in the securities market, and reports of loss of rubber at sea, the price took a downward tendency which continued until 20.05 was touched on October 28, despite the publication of statistics showing a sharp increase in tire shipments during September and the repeal of the embargo by the Senate. A flurry of commission house buying and renewed foreign interest brought the price back to higher channels in the next few days but lack of an announcement from the International Rubber Regulation Committee, which met in London on November 2, with regard to the quota restrictions for the first quarter of 1940, caused the price to dip again. The growing scarcity of available supplies, however, brought the price up to 20.55 today (November 9). Quotations in the outside market, Exchange, London and Singapore, follow:

As of November 9

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.20⅜
January-March	—	@	.20
April-June	—	@	.19
No. 2	—	@	.20¼
No. 3	—	@	.20
No. 4	—	@	.19¼
Thin Latex Crepe	—	@	.23¼
Thick Latex Crepe	—	@	.22¾
Brown Crepe, No. 1	—	@	.19⅞
Brown Crepe, No. 2	—	@	.19½
Amber Crepe, No. 2	—	@	.19⅝
Amber Crepe, No. 3	—	@	.19½
Brown Crepe, Rolled	—	@	.18¾

Latex—

Normal, per lb., carload lots.	—	@	.25

Paras—

Up-River, fine	—	@	—
Acre Bolivian, fine	—	@	.19½

Balata

Surinam sheet	—	@	.38

LONDON MARKET

Standard Smoked Sheets—Sellers—November 9

January-March	—	@	11 3/16d
April-June	10⅞	@	11d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—November 9

January-March	—	@	10 3/32d
April-June	—	@	9 31/32d

Reclaimed Rubber

The better demand for reclaim initiated in late September continued throughout last month. Although reclaimers anticipate a slackening off in demand from the tire manufacturers, increased demand is looked for from the mechanical rubber goods and insulated wire divisions of the industry. Current quotations follow:

Shoe

Unwashed lb.	.06½	@	.06¾
Washed lb.	.10	@	.10¼

Tube

No. 2 (Compounded) lb.	.09	@	.10
Red Tube lb.	.09	@	.09¼

Tires

Black (acid process) lb.	.07	@	.07¼
Black, selected tires lb.	.06	@	.06¼
Dark Gray lb.	.09¼	@	.10
White lb.	.12½	@	.14
Truck, Heavy Gravity lb.	.05½	@	.06
Truck, Light Gravity lb.	.07	@	.07½

Miscellaneous

Mechanical blends lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Business continues brisk in scrap rubber circles with export demand equalling domestic requirements. Prices have advanced on practically all grades of scrap since our last report, particularly on boot and shoe stocks. Current quotations follow.

(Prices to Consumers)

Auto tire peelings ton	24.00	@	25.00
Mixed auto ton	13.50	@	15.00
Beadless tires ton	15.50	@	18.00
Clean solid truck tires ton	27.50	@	30.00
Boots and shoes ton	20.00	@	21.00
Arctics, untrimmed ton	15.00	@	16.00
Inner tubes, No. 1 lb.	.09	@	.10
Inner tubes, No. 2 lb.	.04½	@	.04¾
Inner tubes, Red lb.	.04⅝	@	.04⅞

Cotton

Cotton prices have swung in a narrow 44 point range since our last report. Low for the period was 9.16 on October 14 and the high of 9.60 was reached today (November 9). The market was rather dull in mid-October, moving up and down a point or two for the most part, until October 22 when the price jumped from 9.20 on the previous trading day to 9.30, the increase being occasioned by European news indicating that a war to the finish was contemplated by Germany. Failure of any new peace overtures in Europe, combined with some demand from foreign sources, brought the price up to 9.42 on October 25 but hedge selling and limited spot activity in the South brought it down to 9.18 by November 1. The firming of foreign markets and rumors from Washington on the new crop estimate brought the price into higher channels in the next few days, and the official estimate of 11,845,000 bales, down 83,000 bales from the previous estimate, sent the price up to 9.47 yesterday (November 8). Speculative buying today (November 9) brought the price to 9.60, high for the period. Further speculation is expected. Quotations for middling uplands on the Exchange follow:

	Oct. 10	November 9*		
	Close	High	Low	Close
December	8.82	9.52	9.52	9.52
March	8.65	9.37	9.37	9.37
July	...	9.08	9.05	9.05

* New Contract.

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3 lb.	.30¾	@	.31
Peeler, carded, 23/4/3 lb.	.31¾	@	.32
Peeler, carded, 15/3/3 lb.	.28¾	@	.29
Peeler, carded, 15/4/2 lb.	.28¾	@	.29
Peeler, carded, 13/3/3 lb.	.27¾	@	.28

CHAFERS

Carded, American, 1 3/16" lb.	.31	@	—
Carded, American, 1" lb.	.23	@	.28

Sheetings

48x40	36 in.	5.50	lb.	— @	.04¾
40x40	36 in.	6.15	lb.	— @	.04⅝
40x36	36 in.	6.50	lb.	— @	.04¼
48x48	40 in.	2.50	lb.	— @	.09¼
48x48	40 in.	2.85	lb.	— @	.08⅞
56x60	40 in.	3.60	lb.	— @	.07¾
48x44	40 in.	3.75	lb.	— @	.06¾

Ducks

Enameling (single filling) lb.	.25	@	.27
Belting and Hose lb.	.30	@	—
Single filling, A grade lb.	.11½	@	.12⅛
Double filling lb.	.12½	@	.13⅛

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 Tons

FROM OCTOBER 11 TO NOVEMBER 9

Date		Spot	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Sales
Oct.	11	19.85	19.65	19.61	19.55	18.75	18.60	18.45	18.38	18.30	18.27	18.25	18.25	18.25	——	96
	12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	13	20.10	19.85	19.75	19.65	18.83	18.66	18.50	18.40	18.32	18.27	18.25	18.25	18.25	——	68
	14	20.10	19.75	19.65	19.55	18.73	18.58	18.43	18.34	18.25	18.23	18.20	18.20	18.20	——	7
	15	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	16	20.10	19.93	19.79	19.66	18.95	18.70	18.45	18.38	18.32	18.27	18.22	18.22	18.22	——	120
	17	20.50	20.33	20.18	20.02	19.20	18.92	18.65	18.56	18.48	18.43	18.38	18.38	18.45	——	171
	18	21.00	20.80	20.60	20.40	19.55	19.22	18.88	18.75	18.61	18.60	18.58	18.58	18.58	——	249
	19	21.00	20.65	20.62	20.59	19.80	19.44	19.09	18.91	18.74	18.72	18.70	18.70	18.70	——	215
	20	20.75	20.37	20.31	20.25	19.60	19.26	18.92	18.71	18.50	18.45	18.40	18.40	18.23	——	163
	21	20.87	20.50	20.44	20.38	19.60	19.25	18.88	18.74	18.59	18.51	18.43	18.42	18.40	——	51
	22	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	23	20.65	20.35	20.27	20.20	19.40	19.15	18.90	18.70	18.50	18.45	18.44	18.43	18.40	——	50
	24	20.38	20.07	20.00	19.93	19.15	18.90	18.65	18.44	18.28	18.19	18.10	18.07	18.05	——	153
	25	20.50	20.00	20.03	20.06	19.40	19.15	18.90	18.72	18.53	18.41	18.30	18.30	18.30	——	89
	26	20.35	19.85	19.90	19.95	19.15	19.00	18.85	18.65	18.44	18.35	18.25	18.25	18.25	——	116
	27	20.25	——	19.90	19.90	19.22	18.97	18.72	18.56	18.40	18.30	18.20	18.20	18.20	——	111
	28	20.05	——	19.65	19.65	19.05	18.80	18.55	18.40	18.25	18.15	18.05	18.05	18.05	——	16
	29	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	30	20.32	——	19.90	19.90	19.15	18.93	18.72	18.56	18.40	18.30	18.20	18.20	18.20	——	29
	31	20.65	——	20.25	20.25	19.45	19.17	18.90	18.74	18.59	18.49	18.40	18.40	18.40	——	140
Nov.	1	20.69	——	20.28	20.28	19.46	19.22	18.98	18.79	18.59	18.47	18.35	18.35	18.35	18.35	64
	2	20.40	——	20.08	20.08	19.28	19.01	18.74	18.56	18.38	18.27	18.15	18.15	18.15	18.15	123
	3	20.40	——	20.18	20.18	19.30	19.04	18.78	18.60	18.41	18.28	18.15	18.15	18.15	18.15	68
	4	20.40	——	20.20	20.20	19.30	19.02	18.75	18.57	18.39	18.24	18.10	18.10	18.10	18.10	22
	5	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	6	20.65	——	20.48	20.48	19.53	19.21	18.90	18.74	18.58	18.41	18.25	18.25	18.25	18.25	70
	7	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	8	20.60	——	20.30	20.41	19.32	18.96	18.60	18.36	18.12	17.93	17.75	17.75	17.75	17.75	136
	9	20.55	——	20.40	20.40	19.30	18.88	18.48	18.29	18.10	17.88	17.67	17.63	17.60	17.60	121

New York
November 9, 1939

Rubber CHEMICAL Markets

All Quotations F.O.B. Works Unless Noted

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.24 @	.30
A-10	lb.	.31 @	.35
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.55 @	.65
Butyl Zimate	lb.	2.50 @	—
Captax	lb.	.50 @	.60
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.45
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	2.50 @	—
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.37½ @	.42
Guantal	lb.	.40 @	.50
Heptene	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.14 @	—
Witco		.15 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	— @	2.35
Oxynone	lb.	.64 @	.80
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	2.50 @	—
Pipsolene	lb.	1.55 @	1.85
R & H 40	lb.	.40 @	.41
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
R-23	lb.	.40 @	—
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	2.00 @	2.25
Rotax	lb.	.60 @	.65
Safex	lb.	1.25 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.18 @	.20
Thiocarbanilid, drums	lb.	.24 @	.30
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Tuads	lb.	2.35 @	—
Ulto	lb.	1.50 @	1.75
Ureka	lb.	.60 @	.75
Ureka Blend B	lb.	.60 @	.75
Ureka C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Zimate	lb.	2.35 @	—
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.37
Ultramarine	lb.	.13 @	—
Browns			
Mapico	lb.	.13 @	—
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome	lb.	.21 @	—
Chromium Oxide, bbl.	lb.	.21 @	—
Guignet's Green	lb.	.?0 @	—
Reds			
Antimony crimson, 15/17	lb.	.45 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone, No. 19	lb.	.05½ @	.05½
Cryptone CB, No. 21	lb.	.05½ @	.05½
Cryptone, ZS-230	lb.	.07½ @	.07¾
Cryptone, ZS-86	lb.	.07½ @	.07¾
Lithopone			
Albalith, black label—11	lb.	.03¾ @	.04
Azolith	lb.	.03¾ @	.04
Ray-bar	lb.	.05½ @	.06½
Ray-cal	lb.	.05½ @	.06½
Rayox	lb.	.14 @	.17
Titanox A	lb.	.13 @	.13¾
Titanox B	lb.	.05¼ @	.05½
Titanox C	lb.	.05¼ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06¼ @	.06½
Anaconda, lead free	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06¼ @	.06½
XX Red—4	lb.	.06¼ @	.06½
XX Red—72	lb.	.06¼ @	.06½
XX Red—78	lb.	.06¼ @	.06½
XX Red—103	lb.	.06¼ @	.06½
Kadox, black label—15	lb.	.06½ @	.06¾
Blue label—16	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06¼ @	.06½
green label	lb.	.06¼ @	.06½
red label	lb.	.06¼ @	.06¼
U. S. P.—7. bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.55 @	.65
Chrome	lb.	.14½ @	.15½
Mapico	lb.	.09½ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0275 @	.0625
Bone, powdered	lb.	.05½ @	.14
Carbon, compressed	lb.	.0275 @	.0625
uncompressed	lb.	.0275 @	.0625
"Certified"	lb.	— @	—
"Spherons"	lb.	— @	—
"Disperso"	lb.	.0275 @	.0625
"Excello," compressed	lb.	.0275 @	.0625
"Fumonex"	lb.	.03 @	.05
"Gastex"	lb.	.03 @	.05
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0275 @	.0625
"Supreme"	lb.	.0275 @	.0625
Thermatomic—"P 33"	lb.	.04¾ @	.07¾
"Thermax"	lb.	.01¾ @	.05
United "Dixie" & "Kosmos"	lb.	.0275 @	.0625

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	13.00 @	15.00
Barium carbonate (98-100%)	ton	— @	—
Barium Dust	lb.	.05 @	.06
Barytes	ton	23.65 @	31.15
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	65.00
Calcene	ton	37.50 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	9.50 @	21.00
Congaree	ton	9.50 @	—
Crown (f.o.b. plant)	ton	9.50 @	—
Dixie	ton	11.00 @	26.00
Dixie, Jr.	ton	9.50 @	24.00
McNamee	ton	9.50 @	22.00
Par	ton	9.50 @	22.00
Witco	ton	9.50 @	—
Cotton Flock (Dark)	lb.	.10½ @	.13
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	24.00 @	50.00
Kalite No. 3	ton	34.00 @	60.00
"Lime Crest" Industrial Filler No. 100	lb.	— @	—
Magnesium carbonate	lb.	.07½ @	—
Mica	ton	35.00 @	44.00
Pyrax A	ton	6.00 @	20.00
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	25.00 @	45.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Witco	ton	6.00 @	—
Wood Flour	ton	20.00 @	25.00
Zinc Carbonate	lb.	— @	—
Zinc Stearate	lb.	— @	—

MINERAL RUBBER

285°-300° Mineral Rubber	ton	21.00 @	42.00
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton	21.00 @	42.00
Parmr, solid	ton	21.00 @	27.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50 @	4.00
Rodo #10	lb.	4.50 @	5.00
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors No. 5145	lb.	2.00 @	—
Areaklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.25 @	.47
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sunproof	lb.	.20 @	.25
Sponge Paste	lb.	— @	.18
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.53 @	2.78
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.10½ @	.13
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.08 @	.09
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10½ @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	3.55
Soda Ash, 58%, C.L.	cwt.	— @	2.35
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.07¾ @	.08
Fluxrite	lb.	.05½ @	.06½
Palm Niger	lb.	.05½ @	.06¼
Para-Flux	gal.	.17 @	.18
Para Lube	lb.	— @	.05
Petrolatum, light	lb.	.03½ @	.03¾
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23¾
Pine, steam distilled	gal.	.64 @	.69
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rubtack	lb.	.08 @	.10
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07 @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05½ @	.06½
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin		— @	—
Retort Pine Tar, drums	ton	20.00 @	26.00
Solvents			
Acetone, pure	lb.	— @	.06¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33 @	.39
Benzene, 90%	gal.	.18 @	.23
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.50
Carbon, bisulfide	lb.	.05¼ @	.08
Carbon tetrachloride	gal.	.73 @	1.065
Dichlorethylene	lb.	— @	.25
Dipentene, cml., drums	gal	.41 @	.50
Ethylene dichloride	lb.	.05½ @	.06½
Plastogen	lb.	.07¾ @	.12½
Reogen (drums)	lb.	.11½ @	.20
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.08½
Turpentine, spirits	gal.	.43 @	.47
dest. dist., drums	gal.	.33 @	.41
Waxes			
Beeswax, white	lb.	.39 @	.45
Carnauba, yellow	lb.	.46 @	.47½
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10¾ @	.11¾
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02¾ @	—
White crude scale 124/126	lb.	.02¾ @	.03
Refined, 122/127	lb.	.04½ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.50 @	1.95
Exel	lb.	1.00 @	1.40
Gel	lb.	.57 @	.73
Hipar	lb.	.65 @	.92
Powder	lb.	.52 @	.64
Resin	lb.	.52 @	.64
Resin D	lb.	.52 @	.64
White	lb.	1.25 @	1.60
Albasan	lb.	.70 @	.75
Antox	lb.	.56 @	.58
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone	lb.	.52 @	.63
Oxynone	lb.	.64 @	.80
Retardex	lb.	.35 @	.40
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

MOLD LUBRICANTS

Aresklene	lb.	.35 @	.50
Cocoa Soapstock		.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mold Paste	lb.	.12 @	.18
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.17 @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.12
Brown	lb.	.08 @	.10½
Neophax	lb.	.09¾ @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½ @	.15
Sulfur Chloride, yellow (drs.)	lb.	.04 @	—
Sulfur flour,			
Refined, 100% pure (bags)	cwt.	2.50 @	3.65
Commercial (bags)	cwt.	1.60 @	2.35
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325.899	173.367.272	23.75	10.309	6.057.637	26.23	315.590
1925	393.370	426,167,504	48.36	14.827	19.847.753	59.76	378.543
1926	409,944	501.131.064	54.57	17.671	22.470.583	56.77	392.273
1927	424,733	338.688.492	35.60	27.775	24.735.488	39.76	396,958
1928	432,633	242.727.423	25.05	32.159	18.128.761	25.17	400.474
1929	560.082	239.177.811	19.06	36.485	16.868.718	20.64	523.597
1930	482.083	139.133.048	12.88	30.205	9.310.205	13.76	451.878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471.581
1932	409,556	31,936,459	3.48	20.930	2.015.612	4.30	388.626
1933	407,817	44.034.064	4.82	20,537	2.601.352	5.65	387.280
1934	449,513	97,929,676	9.73	23,848	5.770.109	10.80	425.665
1935	453,134	115.299,448	11.36	11.389	3,084.331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4.488.223	15.93	454.483
1937	574,600	237.307,041	18.44	7,902	3,385,433	19.02	566.698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1938:							
Sept.	34,383	10.650,107	13.83	803	242,324	13.48	33,580
Oct.	33,449	10,945,896	14.61	621	196,523	14.14	32,828
Nov.	31,903	10,572,345	14.79	415	146,276	15.73	31,488
Dec.	36,031	12,601,926	15.61	424	141,364	14.87	35,607
1939							
Jan.	35,255	12,313,006	15.59	468	165,663	15.79	34,787
Feb.	29,109	10,269,224	15.75	460	152,113	14.76	28,649
Mar.	43,490	15,058,279	15.46	439	171,279	17.43	43,051
Apr.	30,836	10,400,125	15.06	440	151,644	15.38	30,396
May	42,998	15,041,433	15.62	496	180,091	16.20	42,502
June	32,437	11,403,150	15.69	413	147,910	16.00	32,024
July	34,288	12,071,105	15.72	440	164,428	16.69	33,848
Aug.	35,794	12,702,958	15.84	267	89,741	15.01	35,527
Sept.	35,006	12,667,740	16.16	1,472	659,055	19.98	33,534

* Revised.

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536.392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2.562.096	354	327,213	7,263	3.127.757	3,394	4,686,743
1927	5,018	2,674,957	582	477.246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755.685	731	430,855	7,552	2.540.059	4,007	2.121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403.244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888.909
1932	....	.....	707	147,403	4,607	616.596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944.895	11.085	1,833.671
1934	398	75,349	1,054	438.209	4,987	943,752	13,107	3,643.221
1935	459	86.835	615	188.384	5,644	1,063.126	13.553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19.852	6.659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1938:								
Sept.	173	37,954	39	13,896	740	225.161	683	235,242
Oct.	126	27,692	45	20,641	614	163,635	876	347,348
Nov.	59	12,923	66	24,725	307	76,452	1,020	394,082
Dec.	181	39,869	13	6,263	917	237,653	1,263	479,966
1939:								
Jan.	226	49,580	61	20,417	843	203,753	1,602	599,927
Feb.	212	46,576	15	4,426	510	129,726	1,717	657,565
Mar.	229	39,520	14	5.215	641	136,112	2,005	731,302
Apr.	180	24,584	59	18,170	281	72,024	1,018	360,739
May	102	22,347	56	16,359	645	161,745	2,786	1,067,682
June	91	19,879	119	33,876	597	122,087	1,836	694,863
July	150	32,626	39	18,813	663	141,540	2,934	1,064,927
Aug.	178	38,687	28	8,689	742	208,156	2,614	1,001,013
Sept.	133	30,091	36	19,682	479	100,285	2,525	965,615

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

	Figures on Monthly Basis: 1932*	1933*	1934*	1935*	1936*	1937*	1938*	1939
Jan.	29,648	22,645	39,190	46,636	48,631	50,879	31,265	46,234
Feb.	31,821	21,392	40,515	42,720	36,841	51,950	25,357	42,365
Mar.	29,505	17,843	47,003	42,153	42,813	54,129	32,389	50,165
Apr.	27,518	25,928	44,853	44,247	52,031	51,859	29,730	44,166
May	30,957	44,074	42,918	41,101	50,612	51,795	30,753	44,377
June	41,475	50,743	40,147	36,156	52,772	51,860	32,540	47,259
July	29,976	49,614	32,553	35,917	48,250	43,703	34,219	43,880
Aug.	23,721	44,428	33,216	38,775	46,777	41,506	40,552	50,481
Sept.	23,847	35,281	30,258	37,086	46,449	43,945	40,183	50,150
Oct.	22,286	31,543	31,253	41,969	49,637	38,754	42,850	
Nov.	23,231	28,831	34,748	42,310	50,433	34,025	49,050	
Dec.	18,015	28,757	36,569	42,474	49,754	29,195	48,143	
Tot.	332,000	401,079	453,223	491,544	575,000	543,600	437,031	

* Revised.

Note: All figures are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	113,078	23.0	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	141,486	24.6	19,000
1932	75,608	77,504	23.4	16,354	1937*	185,033	162,000	29.8	28,800
1933	99,560	81,602	19.9	20,746	1938*	122,403	120,800	27.6	23,000

	Figures on Monthly Basis: Production	Consumption Tons	Consumption % to Crude	Stocks*		Production	Consumption Tons	Consumption % to Crude	Stocks*
1938:*									
Jan.	8,303	7,463	23.9	28,982	July	7,668	8,777	25.6	18,956
Feb.	6,685	7,679	30.3	27,518	Aug.	11,295	11,387	28.1	18,307
Mar.	7,416	9,109	28.1	25,366	Sept.	12,961	11,969	29.8	18,540
Apr.	6,902	8,043	27.1	23,799	Oct.	14,624	12,522	29.2	19,910
May	7,406	8,613	28.0	22,042	Nov.	15,095	13,440	27.4	21,001
June	8,180	8,779	27.0	20,785	Dec.	15,868	13,019	27.1	23,000
1939:									
Jan.	13,763	13,000	28.1	21,960	July	12,588	13,542	30.9	21,339
Feb.	13,093	12,626	29.8	21,390	Aug.	17,214	16,846	33.4	20,645
Mar.	14,528	15,322	30.5	19,955	Sept.	17,990	16,953	33.8	21,185
Apr.	14,527	13,391	30.3	22,628	Oct.	.....	.....	...	.....
May	14,769	13,517	30.5	22,771	Nov.	.....	.....	...	.....
June	15,871	14,870	31.4	23,058	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1938 were revised on June 1, 1939, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1937*	1938*	1939		1937*	1938*	1939
January	33,668	35,323	37,487	August	49,598	50,549	53,728
February	32,034	31,981	34,595	September	47,515	46,150	49,347
March	40,524	41,409	42,520	October	45,446	46,365	.....
April	43,461	43,430	43,977	November	42,718	45,084	.....
May	45,407	44,937	49,547	December	39,465	41,742	.....
June	48,447	48,383	49,812				
July	51,069	47,650	50,508	Total	519,352	523,003	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1927	19.700.003	1931	11.253.800	1935	18.664.356
1928	24,247.282	1932	6.261.336	1936	20.790.192
1929	24.141.502	1933	8.713.962	1937	22.257.964
1930	17.364.096	1934	12,255,118	1938	10,612,138

1939		1939		1939	
January ...	1,714,137	May	1.243.519	September .	1,585,300
February ..	1,442.535	June	1,019,626	October ...	1,882,190
March	1,730.211	July	681,434	November .	.....
April	1,348,335	August	970,571	December .	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1937																																
July	19 3/8	19 3/8	—	18 5/8	18 1/4	19 1/8	19 1/8	19 1/8	19 1/8	18 7/8	—	19	19	19 5/8	19 3/8	18 7/8	18 5/8	18 5/8	18 5/8	18 5/8	18 5/8	18 3/4	18 3/4	—	—	18 3/8	18 3/8	18 3/8	18 3/8	18 3/8	—	18 5/8
Aug.	18 5/8	18 5/8	—	18 1/2	18 1/4	18 1/4	18 3/4	19 3/8	19 3/8	19 3/8	18 7/8	18 7/8	18 7/8	18 7/8	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 5/8
Sept.	18 1/4	18 1/4	—	—	—	—	18 3/4	19 3/8	19 3/8	19 3/8	18 7/8	18 7/8	18 7/8	18 7/8	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 5/8
Oct.	17 3/4	17 3/4	—	17 3/4	17 3/4	17	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	16 3/4
Nov.	15 7/8	15 7/8	—	14 1/8	14 1/8	14 7/8	14 7/8	14 7/8	14	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8
Dec.	15	15 1/8	—	15 1/2	—	15 1/8	15 3/4	15 3/4	15	15	15	15	15	15	15	15	15	15 1/8	15 1/8	15	15 1/8	15 1/8	15	15 3/8	15 3/8	14 7/8	14 7/8	14 1/2	14 1/2	14 7/8	14 7/8	15
1938																																
Jan.	—	—	14 3/8	14 3/8	14 3/8	—	14 3/8	14 3/8	—	14 3/8	14 3/8	14 3/8	—	14 3/8	14 3/8	—	14 1/8	14 1/8	14 1/8	14	14 1/8	14 1/8	—	14 1/8	14 1/8	14 1/8	14 1/8	14 1/8	14 1/2	—	14 3/8	14 3/8
Feb.	14 1/2	14 1/2	14 1/8	14 1/8	14 1/4	—	14 3/8	14 3/8	14 3/8	14 3/8	14 3/8	14	14 1/8	14 3/4	14 1/2	14 1/4	14	14 3/4	14 3/4	—	14 3/4	13 3/4	13 3/4	12 3/8	12 3/8	12 1/8	12 1/8	11 3/8	11 3/8	10 1/4	10 1/4	13 1/2
Mar.	10 3/8	10 3/8	11 3/8	11 3/8	11	11 1/2	11 3/4	11 3/4	11 3/8	11 3/8	11 3/8	11 3/8	12 1/4	12 1/2	12	11 7/8	12 1/4	12 3/4	12 3/4	13 1/8	12 7/8	12 3/4	12 3/4	12 3/8	12 3/8	11 3/4	11 3/4	11 7/8	11 7/8	11 3/8	11 3/8	11 7/8
Apr.	11 3/8	11 3/8	11 3/8	11 3/8	11 3/8	11 1/2	11 3/4	11 3/4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
May	11 3/8	11 3/8	11 3/8	11 3/8	11 3/8	11 1/2	11 3/4	11 3/4	11 3/4	11 3/4	11 3/4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
June	11 3/8	11 3/8	—	11 3/8	—	11 3/4	11 3/4	11 3/4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
July	15 1/8	15 1/8	—	14 3/4	14 3/4	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
August	15 1/8	15 1/8	—	15 1/8	16	—	16 1/8	16 1/8	16 1/8	16 1/8	15 1/8	15 1/8	16 3/4	16 3/4	15 3/4	15 3/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4	16 1/4
Sept.	16 1/4	16 1/4	—	16 3/4	17	16 7/8	17	17 1/8	17 1/8	17 1/8	17 1/8	16 7/8	16 3/4	16 3/4	16 3/4	17 1/8	17	17	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8
Oct.	16 1/4	16 1/4	16 3/4	16 3/4	17	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8
Nov.	16 1/4	16 1/4	16 1/4	16 1/4	—	16 7/8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dec.	15 7/8	15 7/8	15 3/4	—	15 1/8	15 7/8	16 1/8	15 7/8	16 1/8	16	—	—	15 7/8	16 1/4	16	16	16 1/8	16 1/8	16 1/4	16 1/4	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
1939																																
Jan.	15 5/8	15 5/8	16 1/8	16 1/8	16	16	16	15 7/8	15 7/8	15 7/8	15 7/8	15 7/8	15 7/8	15 7/8	15 7/8	15 7/8	15 7/8	15 3/4	15 3/4	15 3/4	15 7/8	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4	15 3/4
Feb.	15 3/4	15 3/4	15 3/4	15 3/4	—	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8	15 1/8
March	16 1/8	16 1/8	16 1/8	16 1/8	16	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
April	15 1/8	15 1/8	16	15 1/8	16	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
May	15 1/8	15 1/8	16	15 1/8	16	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
June	15 7/8	15 7/8	16	15 1/8	16	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8	16 1/8
July	16 7/8	16 7/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8
August	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8
September	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8
October	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8
November	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8	16 3/8

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1911-1931

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17

Average Monthly Price per Pound Since 1932

	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents
Jan.	4.38	3.08	9.32	13.10	14.35	21.37	14.63	15.75
Feb.	4.03	2.95	10.45	12.92	15.48	21.33	14.71	15.93
Mar.	3.35	3.01	11.01	11.51	15.89	24.09	13.55	16.26
Apr.	3.02	3.56	12.10	11.55	15.98	23.44	11.84	15.87
May	3.09	4.95	13.26	12.05	15.62	21.14	11.57	16.07
June	2.66	6.15	13.51	12.57	15.85	19.29	12.57	16.37
July	2.89	8.01	14.60	12.10	16.49	18.86	15.37	16.51
Aug.	3.63	7.31	15.47	11.98	16.25	18.37	16.08	16.67
Sept.	3.84	7.30	15.36	11.55	16.46	18.55	16.15	21.24
Oct.	3.65	7.64	13.96	12.62	16.55	16.28	16.89	19.89
Nov.	3.44	8.66	13.04	13.15	17.97	14.60	16.24	
Dec.	3.24	8.87	12.98	13.28	20.01	15.41	16.05	
Average for Year	3.49	5.96	12.92	12.37	16.41	19.39	14.64	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1939 Aug.	1939 Sept.	1939 Oct.	1939 Nov.	Day	1939 Aug.	1939 Sept.	1939 Oct.	1939 Nov.
1	8 1/16	—	—	11 5/16	17	8 1/16	—	10 3/16	
2	8 1/8	—	9 1/16	11 1/16	18	8 3/8	9 3/4	10 1/2	
3	8 1/16	—	9 1/2	11 1/16	19	—	9 3/8	10 5/16	
4	8 1/2	—	9 7/16	—	20	—	9 1/2	10 5/16	
5	—	—	9 7/16	—	21	8 5/16	9 1/2	—	
6	—	—	9 1/2	11 1/16	22	8 3/8	9 1/2	—	
7	—	10	—	11 1/16	23	8 1/2	—	10 1/4	
8	8 1/2	9 1/2	—	11 1/16	24	8 1/2	—	10 3/8	
9	8 1/2	—	9 5/16	11 1/16	25	8 1/16	9 3/8	10 5/8	
10	8 1/2	—	9 5/16		26	—	9 3/8	10 1/4	
11	8 1/2	10	9 3/8		27	—	9 3/8	10 1/4	
12	—	10	10		28	8 3/8	9 3/8	—	
13	—	10	10 1/16		29	8 3/4	9 3/8	—	
14	8 1/16	9 3/4	—		30	8 1/2	—	10 7/8	
15	8 1/16	9 3/4	—		31	8 1/2	—	11 1/16	
16	8 1/2	—	10 5/16						

Average Monthly Price Per Pound

Month	1936 Pence	1937 Pence	1938 Pence	1939 Pence	Month	1936 Pence	1937 Pence	1938 Pence	1939 Pence
Jan.	6.758	10.378	7.077	7.926	Aug.	7.581	8.830	7.841	8.545
Feb.	7.255	10.503	7.029	7.942	Sept.	7.577	8.935	7.918	9.634
Mar.	7.450	11.766	6.590	8.120	Oct.	7.898	7.855	8.355	10.177
Apr.	7.502	11.471	5.793	7.910	Nov.	8.572	7.080	8.111	
May	7.335	10.250	5.632	8.002	Dec.	9.580	7.332	8.005	
June	7.352	9.548	6.147	8.216	Average for Year	7.713	9.424	7.164	
July	7.696	9.136	7.464	8.271					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1939 Sept.	1939 Oct.	1939 Nov.	Date	1939 Sept.	1939 Oct.	1939 Nov.	Date	1939 Sept.	1939 Oct.	1939 Nov.
1	8.92	—	9.18	11	9.64	9.18		22	9.13	—	
2	8.87	9.33	9.18	12	9.58	—		23	9.08	9.30	
3	—	9.22	9.37	13	9.45	9.17		24	—	9.35	
4	—	9.20	9.41	14	9.55	9.16		25	9.08	9.42	
5	9.25	9.17	—	15	9.48	—		26	9.11	9.36	
6	9.49	9.19	9.33	16	9.20	9.21		27	9.18	9.39	
7	10.00	9.16	—	17	—	9.22		28	9.27	9.31	
8	9.82	—	9.47	18	9.07	9.22		29	9.29	—	
9	9.35	9.09	9.60	19	9.05	9.28		30	9.39	9.34	
10	—	9.14		20	9.17	9.19		31	—	9.30	
				21	9.12	9.20					

Average Monthly Price Per Pound

	1936 Cents	1937 Cents	1938 Cents	1939 Cents		1936 Cents	1937 Cents	1938 Cents	1939 Cents
Jan.	11.91	13.06	8.57	8.94	Aug.	12.28	10.41	8.41	9.30
Feb.	11.53	13.15	8.91	8.97	Sept.	12.31	9.02	8.17	9.30
Mar.	11.43	14.46	8.92	9.00	Oct.	12.30	8.42	8.61	9.24
Apr.	11.71	14.23	8.76	8.87	Nov.	12.23	7.96	9.08	
May	11.68	13.34	8.50	9.56	Dec.	12.83	8.26	8.72	
June	12.02	12.70	8.38	9.88	Average for Year	12.11	11.44	8.66	
July	13.11	12.26	8.85	9.71					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of:	ON HAND 1937	1938*	1939	AFLOAT 1937	1938	1939	ON HAND AND AFLOAT 1937	1938*	1939
Jan.	204,436	276,497	237,826	55,096	57,356	48,210	259,532	333,853	286,036
Feb.	195,692	292,067	231,475	53,538	47,459	55,814	249,230	339,526	287,289
Mar.	192,980	301,762	205,936	56,994	41,882	55,981	249,974	343,644	261,917
Apr.	176,289	303,901	190,896	72,530	39,071	57,918	248,819	342,972	248,814
May	175,273	300,907	193,602	58,542	32,859	54,046	233,815	333,766	247,648
June	172,056	294,796	181,794	57,215	32,079	51,274	229,271	326,875	233,068
July	167,094	282,785	174,240	75,779	40,400	52,990	242,873	323,185	227,230
Aug.	174,195	273,841	161,362*	80,439	47,772	66,717	254,634	321,613	228,079*
Sept.	186,193	268,094	150,171	83,288	48,927	68,310	269,481	317,021	218,481
Oct.	200,025	259,074		80,653	50,162		280,678	310,136	
Nov.	222,707	242,592		81,302	51,114		304,009	293,706	
Dec.	262,204	231,500		63,099	45,105		325,303	276,605	

* Revised.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1937	1938	1939	Liverpool 1937	1938	1939
January	29,005	40,203	51,420	41,895	21,711	28,789
February	26,508	46,596	48,312	37,078	24,737	26,784
March	21,292	50,233	46,768	30,622	26,220	24,996
April	21,128	54,296	44,760	27,443	28,277	23,742
May	21,351	57,194	43,454	25,081	29,862	22,211
June	21,964	60,307	42,374	21,258	31,837	21,176
July	22,589	62,236	37,772	19,424	32,825	19,116
August	25,211	65,113	28,363	19,817	34,315	16,218
September	28,462	63,321		21,190	34,645	
October	30,465	59,609		21,327	33,483	
November	33,304	57,794		21,399	32,116	
December	35,633	55,668		21,978	31,012	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [3]	Holland	Para and Manaos
At end of 1938					
August	41,002	49,922	4,659	672	1,032
September	35,386	53,815	5,339	662	1,599
October	34,901	54,720	4,916	669	1,796*
November	31,255	54,283	4,409	349	2,267
December	27,084	57,860	6,120	268	1,864
At end of 1939					
January	30,975	59,155	4,827	198	1,557
February	28,559	59,399	4,318	183	1,826
March	23,255	58,005	3,389	137	2,244*
April	22,434	55,238	3,648	131	2,209
May	20,849	52,837*	4,005	136	1,966
June	19,563*	55,834	3,771	101	1,821
July	27,042	55,948	4,217	...	1,474

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
End of: 1938				
July	40,400	39,150	25,450	105,000
August	47,772	34,500	18,728	101,000
September	48,927	29,200	17,873	96,000
October	51,062	26,100	21,838	99,000
November	51,114	26,700	14,186	92,000
December	45,105	26,800	8,095	80,000
End of: 1939				
January	48,210	27,900	28,890	105,000
February	55,814	28,300	21,886	106,000
March	55,981	25,200	20,819	102,000
April	57,918	27,200	13,882	99,000
May	54,046	25,700	16,254	96,000
June	51,274	25,260	11,466	88,000
July	52,990	31,000	21,010	105,000
August	66,717	30,000	23,283	120,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

TOTAL PRINCIPAL WORLD STOCKS

(Figures from the Survey of Current Business)

At End of:	1934	1935	1936	1937*	1938*	1939
January	661,948	698,153	600,479	454,249	549,762	497,665
February	663,308	686,195	599,355	445,265	565,833	479,578
March	666,382	678,809	583,318	447,856	586,666	460,723
April	658,796	677,006	567,172	428,249	586,291	438,252
May	689,239	677,569	541,871	413,134	568,158	429,979
June	672,804	671,525	520,255	434,250	573,136	407,640
July	676,200	679,061	519,074	445,782	580,654	418,639
August	674,702	680,644	500,520	457,462	565,394	400,428
September	694,361	661,509	493,585	470,768	551,447	.....
October	680,616	655,000	486,159	479,398	540,976	.....
November	684,408	617,300	466,491	493,266	512,196	.....
December	705,975	613,987	466,576	545,533	482,852	.....
Monthly Avge.	677,395	666,397	528,738	460,022	555,280	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	11,004	6,635	13,437	13,355	11,376	15,565	7,532	13,702*
Apr.-June	12,980	14,412	13,565	12,597	14,892	15,834	8,353	13,490*
July-Sept.	9,245	14,707	9,822	11,312	14,914	12,207	11,240	14,987
Oct.-Dec.	6,856	9,550	10,406	12,099	14,858	9,704	13,052	
Total	40,085	45,304	47,230	49,363	56,040	53,310	40,182	

Shipment Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	8,760	6,981	10,730	11,154	10,554	14,143	7,534	12,156*
Apr.-June	18,021	15,139	14,998	13,473	15,940	15,741	10,362	14,908*
July-Sept.	8,141	13,707	11,648	13,489	14,037	13,106	11,748	15,540
Oct.-Dec.	5,329	8,265	9,310	12,066	12,855	10,495	12,685	
Total	40,251	44,092	46,686	50,182	53,386	53,485	42,330	

Inventory Figures [2]

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	9,878	7,290	11,651	11,675	8,762	12,004	10,521	10,248*
Apr.-June	4,999	6,615	10,219	10,755	7,556	12,081	8,470	8,909*
July-Sept.	6,096	7,595	8,419	8,288	8,690	11,200	8,022	8,335
Oct.-Dec.	7,644	8,888	9,455	8,196	10,717	10,383	8,451	

Figures for Recent Months

	PRODUCTION 1937	1938	1939	SHIPMENTS 1937	1938	1939	INVENTORY [2] 1937	1938	1939
July	4,138	3,287	4,510	5,005	3,870	5,056	11,238	8,041	8,300
Aug.	3,841	4,038	5,492	4,711	3,991	4,919	10,427	8,217	8,891
Sept.	4,227	3,916	4,985	3,390	3,888	5,565	11,200	8,022	8,335

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	10,721	6,230	12,823	12,553	11,891	15,831	7,314	12,385*
Apr.-June	11,913	13,001	13,191	11,631	14,624	15,413	7,380	12,067*
July-Sept.	8,286	14,356	10,321	11,270	15,320	12,038	10,794	13,424
Oct.-Dec.	5,970	9,000	9,891	12,425	15,201	9,092	12,360	
Total	36,890	42,587	46,226	47,879	57,036	52,374	37,848	

Shipment Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	8,918	6,539	10,640	11,252	11,367	14,606	7,387	11,371*
Apr.-June	16,271	13,292	14,553	11,928	15,113	15,495	9,564	13,233*
July-Sept.	7,761	13,370	11,545	13,251	15,069	12,901	11,243	13,736
Oct.-Dec.	4,961	8,189	8,306	11,636	12,874	9,765	12,099	
Total	37,911	41,390	45,044	48,067	54,423	52,767	40,239	

Inventory Figures [2]

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	9,448	6,369	10,244	10,406	8,660	11,993	10,547	9,163*
Apr.-June	5,174	6,097	8,795	10,050	8,075	11,833	8,337	8,044*
July-Sept.	5,753	7,008	7,639	7,565	8,595	11,326	7,859	7,631
Oct.-Dec.	6,749	7,815	9,180	8,231	10,945	10,312	8,166	

Figures for Recent Months

	PRODUCTION 1937	1938	1939	SHIPMENTS 1937	1938	1939	INVENTORY [2] 1937	1938	1939
July	4,049	2,936	4,043	5,084	3,519	4,285	10,950	7,723	7,819
Aug.	3,914	4,026	4,918	4,721	3,744	4,432	10,220	8,029	8,238
Sept.	4,074	3,832	4,463	3,096	3,980	5,019	11,326	7,859	7,631

[1] Based on reports received from the Rubber Manufacturers Association.
[2] Held by manufacturers at end of period indicated.
* Revised.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937*	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,635	2,000,985	488,650	166,142	125,081	41,061	2,655,777
1939							
Jan.*	342,156	281,465	60,691	14,794	11,404	3,390	356,950
Feb.*	303,217	243,000	60,217	14,300	10,914	3,386	317,517
Mar.	371,940	299,703	72,237	17,549	12,689	4,860	389,489
Apr.	337,372	273,409	63,963	16,891	12,791	4,100	354,263
May	297,508	237,870	59,638	15,706	11,585	4,121	313,214
June	309,720	246,704	63,016	14,515	10,585	3,930	324,235
July	209,343	150,738	58,605	9,435	5,112	4,023	218,478
Aug.	99,868	61,384	38,484	3,475	1,068	2,407	103,343
Sept.	188,751	161,625	27,126	3,921	3,494	427	192,672

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							NETHERLAND INDIES [4]						
	Gross Exports	Imports	Net Exports	Ceylon [2]	India & Burma [3]	Sarawak [3]	British North Borneo [3]	Siam [5]	Java & Madura	Sumatra E. Coast	Other N. I.	Indo-China [3]	Amazon Valley	All Other [5]	World Total [6]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	73,952	87,747	116,009	11,696	12,121	3,294	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,345	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1938:															
May	38,245	10,325	27,920	2,833	1,470	1,648	815	2,507	4,575	7,515	9,944	3,118	1,053	904	64,302
June	42,258	14,394	27,864	3,693	1,318	2,441	643	3,904	4,519	7,788	12,120	4,776	718	818	70,602
July	43,689	18,713	24,976	3,861	1,083	2,057	937	4,710	6,808	8,271	19,955	5,139	625	1,063	79,485
Aug.	47,246	13,735	33,511	4,401	953	965	728	4,793	4,757	7,339	11,006	3,840	1,050	1,074	74,417
Sept.	40,992	10,586	30,406	3,990	1,036	756	284	3,893	4,026	7,052	9,092	8,139	758	1,292	70,724
Oct.	42,294	16,599	25,695	4,893	1,111	1,612	1,075	4,438	4,486	8,229	17,166	3,638	1,796	1,092	75,231
Nov.	39,340	10,219	29,121	6,422	1,271	929	567	3,223	3,975	5,678	9,568	4,035	1,159	990	66,938
Dec.	32,901	7,607	25,294	3,212	1,586	599	227	3,029	1,873	4,332	4,315	9,815	2,205	1,021	57,508
1939:															
Jan.	43,332	19,049	24,283	7,237	1,879	2,342	1,604	2,918	6,787	11,261	20,630	4,739	1,708	1,200*	86,588
Feb.	43,084	13,889	29,195	5,495	1,565	1,484	664	5,606	4,833	8,410	11,658	5,659	1,056	1,200*	76,825
Mar.	43,259	14,035	29,224	3,718	1,393	1,177	344	5,401	5,361	8,084	14,428	4,636	1,331	1,200*	76,297
Apr.	43,668	13,996	29,672	2,225	1,260	2,446	1,687	2,660	5,321	9,250	13,691	2,581	1,139	1,200*	73,132
May	42,214	12,697	29,517	2,807	1,678	1,649	558	2,782	4,105	8,159	12,009	4,585	874	1,200*	69,923
June	31,541	9,567	21,974	3,708	1,452	1,157	332	1,748	5,839	8,846	12,754	4,630	591	1,200*	64,231
July	45,962	20,052	25,910	5,018	1,291	3,092	1,603	5,599	5,229	11,020	19,325	3,367	1,019	1,200*	83,673
Aug.	53,497	12,635	40,862	5,686	427	1,749	975	5,230	6,236	10,010	11,232	7,020	1,000	1,200*	91,627
Sept.	51,466	18,302	33,164	6,149	785	1,932	429	4,496	5,168	10,278	22,197	6,040	1,000*	1,200*	92,838

All figures from January, 1934, onward are net exports shown on a "dry rubber" basis as calculated by the International Rubber Regulation Committee. (1) Prior to January, 1934, Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex also is not included in the early years, which on a dry rubber basis was as follows: 1924—1,117 tons; 1925—3,618; 1926—3,263; 1927—2,439; 1928—2,247; 1929—3,574; 1930—2,750; 1931—1,940; 1932—5,193; 1933—10,470, and 1934—14,172 tons. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments on a dry rubber basis were: 1923—18 tons; 1924—90; 1925—6; 1926—20; 1927—½; 1928—1; 1929—2; 1930—11; 1931—2; 1932—2; 1933—1, and 1934—6 tons. (3) Official statistics. (4) Exports from "Other N. I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included in earlier years, which is as follows on a dry rubber basis: 1923—2,342 tons; 1924—1,008; 1925—2,239; 1926—44; 1927—84; 1928—1,395; 1929—437; 1930—2,744; 1931—3,874; 1932—3,488; 1933—5,260, and 1934—5,330 tons. (5) Calculated from official import statistics of principal consuming countries; also includes United States imports of guayule. (6) This total includes the third column for British Malaya and all other figures shown for other territories. (*) Figure is provisional.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,646	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,663	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1938:															
May	27,809	14,675	5,169	9,595	2,545	3,327	2,422	4,163	1,041	1,137	419	1,283	200*	957	74,742
June	26,429	14,053	4,542	7,478	3,243	2,145	2,399	505	805	853	663	1,149	200*	988	65,452
July	22,209	12,678	5,433	6,927	2,685	3,099	3,641	541	1,215	1,106	528	1,151	200*	635	62,048
Aug.	31,494	12,891	3,662	7,190	1,832	2,033	2,078	739	1,182	1,238	259	965	200*	595	66,358
Sept.	34,436	8,100	5,094	7,390	1,405	3,584	1,799	1,725	1,779	519	385	1,830	200*	608	68,854
Oct.	33,830	3,085	3,791	6,326	3,139	3,204	3,921	2,000*	1,780	848	420	3,022	200*	9	65,575
Nov.	32,567	936	5,322	7,275	3,123	4,665	1,984	4,000*	660	636	530	1,209	200*	379	63,486
Dec.	37,051	4,134	5,820	7,481	2,198	4,000	2,355	2,500*	647	876	263	1,013	200*	648	69,186
1939:															
Jan.	36,614	836	4,684	7,227	2,867	2,553	2,133	4,000*	910	898	454	1,037	200*	1,131	65,544
Feb.	30,578	4,773	5,315	7,569	1,451	3,263	2,025	2,000*	1,741	1,068	184	858	200*	524	61,549
Mar.	45,286	8,082	4,503	8,036	2,458	4,019	1,525	2,000*	1,316	1,242	368	1,133	200*	463	80,631
Apr.	31,590	4,752	5,639	8,719	1,466	3,579	1,926	2,000*	1,108	855	333	1,062	200*	597	63,826
May	45,390	7,531	4,646	8,413	3,006	4,438	1,573	2,000*	1,188	792	518	1,654	200*	618	81,967
June	33,951	8,439	4,649	8,190	2,423	3,067	1,992	2,000*	1,308	621	672	2,703	200*	487	70,702
July	36,932	4,040	4,282	8,437	3,164	3,668	1,350	1,000*	1,422	859	565	824	200*	412	67,155
Aug.	38,319	2,044	4,000*		2,033	3,000*	1,500*	2,000*	2,182	952	651	1,546	200*	400*	
Sept.	36,197														

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.